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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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The Chemical Engineers' Conference

THE informal conference of chemical engineers held in London last week effectually disposed of one problem. By general assent it decided that the Chemical Engineering Group would not require an elegiac poet to prepare its epitaph for quite some time to come. It is to remain the vigorous community it has been from the start, co-operating with the Institution of Chemical Engineers in the promotion of interests common to both bodies, supplementing its work in various ways and establishing, in addition, friendly and more intimate relations with the parent Society, the Coke Oven Managers, and similar organisations. If any incipient doubts existed on the point they were promptly extinguished by Mr. Talbot's admirable opening survey of the situation, and from that point on the only question was the future programme of work.

In relation, first of all, to the Institution, the Group has still a field that an incorporated examining and diploma-conferring body might not be so free to cultivate. Its educational and propagandist work prepared the way for the Institution—in fact, made its creation possible. It has still a great work to do in stimulating interest in chemical engineering, in organising those admirable periodical conferences and in binding all concerned in chemical engineering, whether academic, industrial or commercial, into a real fellowship. It may also, let us hope, infect other organisations with the spirit of good fellowship which accounts so largely for its own success.

The Institution of Chemical Engineers, one may be sure, is no more anxious to see the Group disappear than are the Group's own members. Professor Hinchley made it clear that the two bodies were complementary, not competitive, in their relations, and were bound to be mutually helpful. The striking rapidity with which the Institution has been established has not rendered the more general work of the sister body the less necessary. They have from the beginning worked for a substantially common aim, and both can find satisfaction in the results achieved. It is only a few years since "chemical engineering" was treated as a standing joke, which served the chemical after-dinner speaker when nothing better was available. Even later it remained a bare idea. To-day it is a concrete reality. The Institution is established with chartered powers, with a substantial membership, with a recognised reputation. To have done all this within a few years is an achievement the size and importance of which has hardly yet been realised. It will seem much bigger when it comes to be looked upon from a distance. It could never have been done but for two things—the natural gift for organising possessed by the original band of workers and the enthusiasm and complete unselfishness with which they have worked for entirely impersonal and public ends.

So much for the chemical engineering aspects. If Friday's conference had considered nothing else it would have been well worth while. But the interest of the conference was sensibly increased by the presence of Dr. Levinstein (the president-elect of the Society of Chemical Industry), Dr. Cranston (Glasgow), Mr. Gabriel Jones (Liverpool) and others, who desire—or so it seems to us—to infuse into the activities of the Society something of the spirit that has made the Group so successful. The speaking about the Society, and especially about its journal, was quite frank, but it was also wholly friendly, and one's impression was that the general effect on both sides was good. Though no actual programme was adopted there was a distinct movement towards common ground, as there usually is among men sincerely out for public work for its own sake. Dr. Levinstein, in view of his prospective election to the presidency of the Society, is already planning a bold scheme of expansion. The help of a vigorous body like the Chemical Engineering Group will be of value in the attack on the inertia that every reformer has first to overcome. Already he obviously commands also the support of a group of the younger minds within the Society, who favour progress. Everyone will wish the forward movement success.

Improving Overseas Trade

THE official returns of overseas trade in chemicals for April are good. The complete returns for the first four months of this year are still better. Comparing the corresponding months of 1928 and 1929, chemical exports have increased by £100,403, and chemical imports have decreased by £75,812. Taking the first four months of the year, in comparison with the corresponding months of 1928, chemical imports have declined by £7,899, and chemical exports have increased by £160,584. The statistics of chemical trade since the disastrous strike year show a steady climb upwards, and the progress still continues.

Turning to the import details, one finds a few rather striking changes. The most conspicuous reduction is in coal-tar products, which have fallen from £47,337 to £1,946; extracts for tanning have also declined from £161,814 to £72,599, coal-tar intermediates have almost exactly doubled, alizarine imports have advanced from £2,429 to £14,796, and potassium compounds other than nitrate have increased from £95,327 to £162,084.

On the export side the increases are spread fairly evenly over the whole range of products. The greatest advance is in sulphate of ammonia exports (£268,446 to £345,791). The decline in shipments to Spain and the Canaries (£104,616 to £17,407) is more than made up by the increase in the exports to Japan from £72,250 to £179,653, and in the increase of shipments to "other countries," from £69,963 to £125,668. The total export of coal-tar products has increased from £91,485 to £156,995, which is principally accounted for by the increase in tar and creosote oils from £6,353 to £109,837. Coal-tar dyestuffs are up from £60,688 to £74,405, and there are also increases in drugs, medicines, etc., and in painters' colours and materials.

The Price of Radium

THE importance of radium for the treatment of cancer has latterly led to a demand for it "regardless of cost." The inquiry recently held in this country resulted in a report advising the purchase, out of a special fund, of a quantity sufficient for curative and research purposes. The importance which the public attaches to the subject is indicated by the fact that the money subscribed publicly, together with the corresponding Treasury grant, more than suffices for the desired purpose. In a recent letter to The *Daily Telegraph*, however, Professor F. A. Lindemann, the distinguished mathematical physicist, raises a very important point, namely—"Is the price of radium justified?"

The vicissitudes of the radium-producing industry are too well known to need detailed recapitulation. The key to the situation is held by the Belgian group, which extracts radium from African ores. It was the competition of this group which dealt such a heavy blow to the United States producers and others. Professor Lindemann takes the line that the expense of the operations necessary to extract radium, together with the price of the ore, must be very high to justify the present market price. In this particular instance, also, the matter is not one which can be regarded from the cold-blooded point of view of supply and demand. The need for radium treatment for one of the most horrible diseases that afflict mankind is urgent, and it is necessary that there should be an ample supply of radium at a reasonable price, having regard to the cost of production. It is by no means certain, without further evidence, that the present price *is* necessarily excessive. The extraction of a minute amount of radium from a large body of ore is obviously governed by numerous unusual factors. In view, however, of the fact that Professor Lindemann has raised the question, it is urgently necessary that some authoritative statement on the subject shall be made.

"Safety First"

THIS, it should be explained at once, has no reference to a popular poster now very much in evidence before the electors. It refers to quite another character, a mythical or symbolical figure known as "Bill," whose portrait appears frequently in the pages of the *I.C.I. Magazine*, and whose function it appears to be to drop into the workshops of Imperial Chemical Industries and advise the men not to do foolish and quite needless things that may result in loss of life or serious injury. Our friend "Bill" has been doing a little talk "about courage," and saying one or two extremely sensible things about an entirely false conception of courage that prevails in many a works.

"Nobody," "Bill" is reported as saying, "likes being laughed at or being told that he's 'windy,' and you'll find lots of safety gadgets not being used for that reason alone. I heard of a shop once where not one in five wore the goggles that were served out, partly because they took it for granted that *they* weren't going to be unlucky but mostly because they didn't want their courage doubted by their mates who had worked with them for years. One day a walloping great splinter hit a new man clean in the middle of the eyepiece of his goggles and splintered it all ways." The manager had the broken goggles nailed to a board and the question in the workshop was soon changed from "Who's windy enough to wear goggles?" into "Who's fool enough to leave them off?"

A good deal of the dislike of employing the safety devices provided for workpeople is explained on this theory—that men do not like to have their courage doubted and that the adoption of precautions may give them a reputation for being faddy and timid souls. An avowed contempt for physical danger is supposed to indicate that a man is "full of pluck," but it is rightly described as "pluck of the wrong kind." In fact, in many a workshop it requires more moral courage to follow the safety rules than to ignore them.

The Calendar

May 23	Faraday Society: Third (Experimental) Report to the Atmospheric Corrosion Research Committee of the British Non-Ferrous Metals Research Association. J. C. Hudson. 8 p.m.	Burlington House, Piccadilly, London.
23	Faraday Society: Annual General Meeting. 7.45 p.m.	Burlington House, London.
24-25	Institute of Chemistry and Society of Chemical Industry: Joint Scottish Meeting.	Glasgow.

Deconcentration: An Aspect of Boiler Control.—(II)

By Technicus

The following is the concluding portion of an article of which the commencement appeared last week.

THE control of boiler water concentration is perhaps most commonly effected by instituting a periodical blow-down. It is to be feared that in many instances this is a rule-of-thumb procedure so far as the extent or percentage of blow-down is concerned, although it can readily be put on a more satisfactory basis.

Intermittent or Periodical Blow-Down

In the first place, the permissible concentrations of salts and suspended materials in the boiler water should be agreed upon; experience with the boiler or type of boiler in question is perhaps the best guide for this at the present time. The permissible limit of concentration will vary with individual boilers, plant lay-out, etc., but for modern high-pressure boilers, with high rates of evaporation, a figure which is merely a fraction of the old 1,000 grains per gallon limit must be looked upon as representing the maximum concentration permissible if foaming and occasional priming are to be efficiently legislated against.

When such a limit has been decided upon for a particular plant, it is easy to calculate the percentage of blow-down necessary to avoid exceeding this limit. The frequency of blow-down may be arranged (within limits) as is most convenient, i.e, daily, bi-weekly or weekly.

Denoting the several variables as follows, an expression enabling the extent of blow-down to be calculated can readily be obtained :—

Let x = the concentration, in grains per gallon, of the permanently soluble salts in the boiler feed-water.

W = the capacity, in gallons, of the boiler at normal working level.

E = the average rate of evaporation in gallons per hour.

n = the number of hour's steaming at rate E between successive blow-downs.

T = the blow-down fraction (i.e., $\%W \div 100$).

r = the number of blow-downs (i.e., prior to cutting out the boiler for inspection or other purpose).

C = the concentration of salts in the boiler water prior to the $r+1$th blow-down (i.e., the maximum attained).

Neglecting the small initial concentration of the boiler water (e.g., x grains per gallon), it can be shown that the boiler water concentration immediately prior to the $r+1$th blow-down is given by the expression :—

$$C = \frac{nEx}{TW}\left[1-(1-T)^{r+1}\right] \text{ grains per gallon.}$$

The concentration C will have been predetermined, and the above expression is perhaps best applied by giving a few trial values to T and constructing a curve. This is simpler than finding T directly from a second expression evolved from the above.

This expression is applicable to cases where r is small, for instance where it is the practice to cut out a boiler once a month or once every two months and the blow-downs are given at, say, bi-weekly intervals.

When a boiler is in commission for several months at a time, and r is consequently large, the extent of blow-down can be found from a simplified expression :—

The limiting value, viz., when r is sufficiently large, of

$$C = \frac{nEx}{TW}\left[1-(1-T)^{r+1}\right]$$

is

$$C = \frac{nEx}{TW}$$

whence

$$T = \frac{nEx}{CW}$$

It is obvious, of course, that having determined the value of T for a given case there is no need to commence the periodical blow-down until the limiting concentration decided upon has been reached by the boiler water. Thus, if this has been fixed at 200 grains per gallon, the blow-downs may be withheld until the boiler water has reached this figure, it being unnecessary waste to blow-down when the boiler concentration is below the danger line.

The time to commence blow-down can be found by simple calculation in the manner adopted to derive the foregoing expressions, and both the time and the blow-down itself may be additionally checked or controlled by periodical tests on the boiler water. These need comprise only the determinations of the dissolved salts and the suspended materials, and are easily and quickly carried out.

Continuous blow-down implies a continuous discharge from the boiler of a relatively small quantity of water per unit of time, at constant rate, and is a procedure to which much attention has latterly been given. The two main advantages derived from such a system as compared with an intermittent or periodical blow-down are:—(1) There is a constant removal of dissolved and suspended material from the boiler permitting the maintenance of uniform concentration, and tending to reduce scale formation and sludge accumulation. (2) It is easy to arrange to utilise the heat in the blow-down water, either for pre-heating the feed or make-up or for the operation of hot-process softeners if such are necessary to the particular job.

The Economic Aspect

The economic aspect of such a system is thus one which is not to be disregarded, and it is this aspect which is largely responsible for the attention the system has received. Of the difficulties attendant upon the operation of a continuous blow-down system, the one which perhaps is to be most anticipated is the erosion of the valves and other control gear due to the suspended material present in the blow-down water. Where trouble of this kind is likely to cause undue inconvenience, there is much to be said for the interposition of a small pressure filter of the type previously referred to. In this event, the filter would not, as when employed alone, return the filtered water to the boiler, but would discharge into the feed heaters or hot-process softener as the case might be.

Perhaps one of the earliest continuous blow-down systems was that introduced by Kestner (*Proc. Inst. Mech. Engrs.*, June, 1921), but, as originally designed, the blow-down water was merely freed from suspended material and then returned to the boilers together with the softened make-up, which was chemically softened in a hot-process softener for which the blow-down supplied the necessary heat. The system, as thus arranged, while effecting a heat economy, did not effect any reduction in or limitation of the concentration of permanently soluble salts in the boiler water. The equipment could, however, be modified to meet this additional and vital demand while yet utilising as far as possible the heat in the blow-down water, which would then be discharged to waste.

A very similar system is to be found in the Neckar equipment. Here the blow-down, after clarification, (i.e., removal of suspended material) is mixed with the raw make-up water and with the softening reagents, and this mixture, after settling, constitutes the boiler-feed. The softening process is a hot one, utilising the heat in the blow-down. Additional equipment is available, however, to prevent the increase of concentration of soluble salts in the boiler above a predetermined limit. When this additional equipment is employed, a proportion of the blow-down is by-passed through it. Owing to drop in pressure, a quantity of this part of the blow-down is recovered as steam and is returned to the boilers as pure condensate, the upper portion of the device being virtually an evaporator. The lower portion is designed as a counter-flow heat-exchanger, and there the heat in the non-evaporated blow-down is given up to the make-up or feed water. For the complete equipment it is claimed that only about 5 per cent. of the heat in the total blow-down is lost, and that from 15 to 20 per cent. of the blow-down is returned to the boilers as condensate or distilled water.

From the point of view of the subject under discussion, it is clear that any system of continuous blow-down which does not cater for the limitation of the concentration of soluble salts in the boiler water, as well as for the removal of suspended material, is incomplete.

A third example of the application of continuous blow-down is to be found in the Permutit system. Here no attempt is made to return the blow-down water to the boilers; after the extraction of the available heat, the blow-down is discharged to waste. The heated make-up can be treated, if necessary, in a hot-process softener. The equipment is so arranged that the blow-down may be drawn from the surface of the water in the boiler or from a point lower down in the drum. For normal operation, the blow-down is taken from the surface, and the apparatus is so designed that the level of the water in the boiler is automatically prevented from falling below a fixed limit. The heat exchanger is of the closed heater type, and the blow-down passes through helical copper coils, the make-up flowing on the outside of these coils.

Where the system is fitted to a bank of boilers, there are independent coils for the blow-down from each individual boiler, and each such bank of coils discharges into a separate weir box before passing to waste. The head of water in the weir box operates a float valve, which in turn regulates the quantity of blow-down permitted from the boiler.

Other continuous blow-down systems of European and American origin might be discussed, but they are all alike in principle and differ mainly in detail of design. Some return the filtered blow-down to the boilers, while others discharge it to waste via some form of heat exchanger. This latter procedure is the one which, as has been indicated, confers the greater benefit.

There is a natural antipathy among many engineers towards any blow-down practice, arising from obvious economic considerations. The continuous blow-down system materially reduces the financial loss usually associated with blowing down, since it arranges for the recovery of a very substantial proportion of the heat contained in the blow-down, and it is, therefore, worth careful consideration.

Overseas Chemical Trade for April

A Satisfactory All-round Improvement

THE Board of Trade returns for April show a very satisfactory improvement all round in chemicals, drugs, dyes and colours. The chemical imports for the month of April are £1,367,561, a decrease of £75,812 compared with April of 1928. The chemical exports for April are £2,055,495, an increase of £100,403 on the 1928 figures and of £216,470 on the 1927 figures. The figures for the first four months of this year are even more conclusive. The chemical imports are £5,378,793, a decrease of £7,899, and the chemical exports are £8,442,400, an increase of £160,584 on the first four months of last year, and of £1,141,647 on the first four months of 1927. The detailed figures are given below :—

Imports

	Quantities. Month ended April 30		Value. Month ended April 30	
	1928.	1929.	1928.	1929.
CHEMICAL MANUFACTURES AND PRODUCTS—			£	£
Acid Acetic .....tons	1,230	1,374	56,696	56,775
Acid Tartaric.....cwt.	3,197	3,693	19,306	23,786
Bleaching Materials ,,	13,039	15,702	12,525	12,596
Borax..... ,,	16,555	29,700	14,111	23,007
Calcium Carbide .. ,,	43,622	72,221	25,514	43,923
Coal Tar Products, value	—	—	47,337	1,946
Glycerine, Crude..cwt.	505	140	1,455	243
Glycerine, Distilled ,,	594	1,103	2,104	2,615
Red Lead and Orange Lead .....cwt.	2,733	2,545	3,791	3,843
Nickel Oxide ..... ,,	50	113	300	571
Potassium Nitrate..cwt.	12,858	9,825	12,460	9,968
Other Potassium Compounds .....cwt.	293,366	584,308	95,327	162,084
Sodium Nitrate.... ,,	106,595	145,893	61,465	70,034
Other Sodium Compounds ..... ,,	41,808	48,766	29,319	27,593
Tartar, Cream of.. ,,	3,743	3,146	16,840	14,036
Zinc Oxide .....tons	883	932	27,375	26,774
All other Sorts ...value	—	—	273,523	315,356
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts .....oz.	119,958	141,820	8,327	9,968
Bark Cinchona (Bark Peruvian, etc.)..cwt.	1,880	642	9,544	2,706
Other Sorts .....value	—	—	249,863	145,106
DYES AND DYESTUFFS, ETC.—				
Intermediate Coal Tar Products .....cwt.	60	80	672	1,275
Alizarine ..... ,,	45	335	2,429	14,796
Indigo, Synthetic . ,,	—	—	—	—
Other Sorts ..... ,,	3,339	4,154	92,567	96,951
Cutch ..... ,,	4,701	7,814	7,751	12,908
Other Dyeing Extracts,,	7,296	2,924	20,671	9,609
Indigo, Natural ... ,,	—	76	—	2,115
Extracts for Tanning ,,	146,239	67,848	161,814	72,599
PAINTERS' COLOURS AND MATERIALS—				
Barytes, ground, and Blanc Fixe .....cwt.	60,832	117,657	13,150	22,940
White Lead (dry).. ,,	10,111	14,238	15,807	23,555
All other Sorts .... ,,	114,694	105,737	161,330	157,883
Total of Chemicals, Drugs, Dyes, and Colours ....value	—	—	1,443,373	1,367,561

Exports

	Quantities Month ended April 30		Value Month ended April 30	
	1928.	1929.	1928.	1929.
CHEMICAL MANUFACTURES AND PRODUCTS—			£	£
Acid Sulphuric ....cwt.	1,615	2,221	2,125	2,881
Acid Tartaric .... ,,	2,345	943	16,041	7,403
Ammonium Chloride (Muriate) .....tons	391	292	8,651	6,354
Ammonium Sulphate—				
To Spain and Canaries tons	10,266	1,695	104,616	17,407
,, Italy ..... ,,	90	545	894	5,153
,, Dutch East Indies tons	1,298	959	13,967	10,161
,, Japan ..... ,,	7,020	17,191	72,250	179,653
,, British West India Islands and British Guiana tons	664	760	6,756	7,749
,, Other Countries ,,	6,653	12,065	69,963	125,668
Total .... ,,	25,991	33,215	268,446	345,791
Bleaching Powder ....cwt.	43,883	35,172	16,326	10,623
COAL TAR PRODUCTS—				
Anthracene .....cwt.	220	—	121	—
Benzol and Toluol..galls.	232,076	18,198	11,783	2,270
Carbolic Acid ....cwt.	23,359	19,547	41,078	28,688
Naphtha .....galls.	4,574	3,312	433	265
Naphthalene (excluding Naphthalene Oil).cwt.	5,508	5,012	2,606	2,160
Tar Oil, Creosote Oil, etc. .....galls.	123,784	3,746,539	6,353	109,837
Other Sorts .....cwt.	55,094	29,987	29,111	13,775
Total ...value	—	—	91,485	156,995
Copper, Sulphate of tons	6,646	6,172	154,766	157,631
Disinfectants, etc. ...cwt.	29,829	30,692	77,621	73,446
Glycerine, Crude .... ,,	3,357	12,275	10,027	15,546
Glycerine, Distilled .. ,,	8,066	11,976	30,725	35,284
Total .... ,,	11,423	24,251	40,752	50,830
POTASSIUM COMPOUNDS—				
Chromate and Bichromate .....cwt.	3,158	1,388	5,760	2,842
Nitrate (Saltpetre) ,,	1,825	857	2,468	1,661
All other Sorts .... ,,	5,408	6,162	13,078	13,411
Total .... ,,	10,391	8,407	21,306	17,914

	Quantities Month ended April 30, 1928.	Quantities Month ended April 30, 1929.	Value Month ended April 30, 1928.	Value Month ended April 30, 1929.
SODIUM COMPOUNDS—				
Carbonate .....cwt.	490,019	440,149	132,435	120,603
Caustic ..... ,,	194,077	143,632	126,215	96,603
Chromate and Bichromate ..... ,,	3,675	2,185	4,870	3,817
Sulphate, including Salt Cake ..... ,,	43,097	129,632	5,729	14,555
All other Sorts .... ,,	70,112	40,604	69,278	45,565
Total .... ,,	800,980	756,202	338,527	281,143
Zinc Oxide .....tons	121	166	4,579	5,587
All other Sorts of Chemical Manufactures ....value	—	—	294,253	277,090
Total of Chemical Manufactures and Products (other than Drugs and Dyestuffs) value	—	—	1,334,878	1,393,688
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts .....oz.	130,320	186,156	13,850	16,669
All other Sorts ..value	—	—	225,868	238,063
Total .... ,,	—	—	239,718	254,732
DYES AND DYESTUFFS—				
Products of Coal Tar cwt.	7,438	11,007	60,688	74,405
Other Sorts ..... ,,	9,496	4,894	8,551	5,744
Total .... ,,	16,934	15,901	69,239	80,149
PAINTERS' COLOURS AND MATERIALS—				
Barytes, ground, and Blanc Fixe ....cwt.	9,647	4,230	2,245	2,302
White Lead (dry).. ,,	2,909	2,675	5,190	5,547
Paints and Colours in paste form .... ,,	46,269	46,560	88,328	91,978
Paints and Enamels Prepared (including Ready Mixed) ..... ,,	37,238	44,329	117,007	138,740
All other Sorts .... ,,	54,509	46,792	98,487	88,359
Total .... ,,	150,572	144,586	311,257	326,926
Total of Chemicals, Drugs, Dyes and Colours ...value	—	—	1,955,092	2,055,495

Re-Exports

			£	£
CHEMICAL MANUFACTURES AND PRODUCTS—				
Acid, Tartaric ....cwt.	87	80	780	639
Borax..... ,,	26	21	40	19
Coal Tar Products value	—	—	15,694	38
Potassium Nitrate (Saltpetre) .....cwt.	2,658	93	2,403	139
Sodium Nitrate.... ,,	4,928	21,156	2,823	11,119
Tartar, Cream of.. ,,	337	496	1,682	2,303
All other Sorts ...value	—	—	24,385	16,332
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts .....oz.	17,537	15,955	1,924	1,637
Bark Cinchona ....cwt.	146	187	585	1,499
All other Sorts ...value	—	—	32 116	39 150
DYES AND DYESTUFFS—				
Cutch .....cwt.	2,409	2,597	4,033	4,063
Other Dyeing Extracts cwt.	226	44	1,172	406
Indigo, natural ... ,,	27	—	296	2
Extracts for Tanning ,,	898	614	952	757
PAINTERS' COLOURS AND MATERIALS ....cwt.	1,066	54,042	4,246	12,241
Total of Chemicals, Drugs, Dyes, and Colours ...value	—	—	93,613	90,468

The Scope of the Chemical Engineer

An Interesting Discussion

A JOINT meeting of the Institute of Fuel and the Institution of Chemical Engineers was held at Burlington House, London, on Wednesday, May 8, Dr. C. H. Lander presiding. The Chairman apologised for the fact that Sir Alexander Gibb (Past-President of the Institution of Chemical Engineers) was unable to take the chair, as had been expected, owing to the fact that he had had a breakdown through overwork and had been compelled to cancel all his engagements for three weeks.

Dr. S. Wolff read a paper on "The Scope of the Chemical Engineer with Special Reference to the Boiler House and the Fuel Industries."

Discussion

Dr. E. W. Smith, who opened the discussion, strongly supported the author's claim that a greater number of men should have the training and the experience which conformed with the superman known as the chemical engineer. At the same time, he did not agree with the author that a chemical engineer should necessarily start at a salary of £500 per annum. Immediately claims of an economic nature were made in this connection the whole thing fell to the ground. Every man must be taken on his merits and must justify himself even to earn £500 per annum. At the same time, a man who had been through the course now recognised as necessary for a chemical engineer should not take long in being able to demand even £500 and more, because a really good chemical engineer was worth a great deal more than that.

The feature arising out of the paper was not so much that we wanted more chemical engineers in charge of industry or administration, but rather that we wanted more technical men of a suitable kind in charge of our various industries.

Sir William Larke said the thanks of the Institute were due to Dr. Wolff for bringing the important question of training of personnel before the Institute. The definition of a chemical engineer, given in the paper as "a professional man experienced in the design, construction and operation of plant and works in which matter undergoes a change of state and composition," might surely be applied to any engineer in charge of industrial productive operations. The best general definition of an engineer was a man who could do for £1 what any fool could do for £2. This involved the capacity to think in terms of relative value as well as technical achievements. This, however, was the broader class of which the chemical engineers were a possibly more limited and specialised subdivision. He ventured to suggest that an academic training was a good foundation on which to build, provided such training was not of a character, far too frequently given even in modern universities, as to produce little more than a highly developed gramophone record.

Professor Hinchley on Training

Professor J. W. Hinchley said it was very pleasing to be in such a delightfully unanimous meeting concerning the need for trained technical men in executive positions, because when he ventured to put forward similar views to the Society of Chemical Industry, 27 years ago, he was met with almost everything short of bad language. The training of chemical engineers was one of the most immediately important problems with which this country was faced, especially when it was appreciated that that training covered not only chemical engineering and engineering but the whole gamut of industry, including management, costings and salesmanship. It was impossible, however, to make a student a chemical engineer. All that could be done was to give that fundamental training and that fundamental enthusiasm which was necessary to enable a man to grow up ultimately, by direct contact with industry, into an efficient industrialist. The real fundamental for the chemical engineer was that he should take steps to be born properly, because only then would it be possible to try to train him properly.

Mr. E. A. Alliott expressed the view that workshop training was of the utmost importance for anybody professing to call himself an engineer of any class. It was absolutely hopeless for any man to go into a modern engineering works straight from college; he ought to have at least three years practical experience in a works as part of his training.

The Future of the Chemical Engineering Group

A Great Programme in Prospect

Following the annual meeting on Friday, May 10, of the Chemical Engineering Group, there was a dinner in the evening, and an informal conference on the question "How can the Chemical Engineering Group best assist in the development of the science and practice of chemical engineering?" The situation was very frankly discussed and there were many suggestions in outline of a large programme of co-operative work in the future.

THE tenth annual general meeting of the Chemical Engineering Group of the Society of Chemical Industry was held at the Criterion Restaurant, London, on Friday, May 10, Mr. H. Talbot (chairman of the Group) presiding.

A Successful Year

The report of the hon. secretary (Mr. H. J. Pooley) on the work of the Group during the year 1928 stated that great success had attended its activities, and that there was a further increase in membership to a total of 466 at the end of 1928. The success of the Group, he said, was due in no small measure to the enthusiasm of and the selfless service rendered by the members of the general committee. No new data sheets had been issued, though work in this direction was proceeding continuously. This was an activity that could not be forced if the resulting information was to be of that standard of reliability which had characterised the data sheets already published.

Reference was made in the report to the continuance of the policy of co-operation, wherever possible, with local sections of the Society and with other learned bodies. Joint meetings had been held with the Birmingham, Bristol, and London Sections of the Society, and meetings had also been held in conjunction with the Institution of Chemical Engineers and the Society of Dyers and Colourists.

Attention was drawn to the loss sustained by the Group in the departure, in April, 1928, of its former chairman, Professor E. C. Williams, from England to take up an important research appointment in California. Professor Williams had been a member of the Group for a number of years, and had throughout taken a keen interest in its development. He carried with him the sincere good wishes of all Group members for his future success. The committee recorded its sincere thanks to the council of the parent Society for its continued interest in the welfare and progress of the Group. Thanks were also expressed to the members of the Group for their consistent support, and to Mr. Mackie (the assistant secretary) and his staff. The report was adopted.

Mr. F. A. Greene (hon. treasurer) presented the accounts for the year, which showed a small balance in hand.

New Officers

It was announced that the following had been re-elected by the committee as officers of the Group for 1929-30:—Chairman, Mr. H. Talbot; hon. secretary, Mr. H. J. Pooley; hon. treasurer, Mr. F. A. Greene.

The following were elected to fill seven vacancies on the general committee:—Dr. S. G. Barker, Messrs. C. Barber, H. W. Cremer, I. P. Llewellyn, F. M. Potter, S. Robson, and S. J. Tungay.

A hearty vote of thanks was accorded the officers and committee for their conduct of the Group's affairs during the past year.

The Evening Conference

The business meeting was followed by the annual dinner of the Group, presided over by Mr. H. Talbot and attended by Dr. H. Levinstein (President-Elect of the Society of Chemical Industry, Dr. Cranston (Glasgow), Mr. Gabriel Jones (Liverpool), Professor Pyman (Nottingham), and other chairmen and secretaries of the local sections of the Society.

The chairman extended a very hearty welcome to Dr. Levinstein and the other guests. He acknowledged that the success of the Group had been due in no small measure to the encouragement and support of the Society, and he wished Dr. Levinstein an extremely prosperous year of office as president.

Dr. Levinstein, in responding, remarked that he was particularly proud to occupy the office, because of the fact that his father held it some years ago.

A discussion followed on "How can the Chemical Engineering Group best assist in the Development of the Science and Practice of Chemical Engineering?"

The Chairman, in opening the discussion, said it was useful at times to take stock of what had been done, and to consider whether or not the lines being followed were the right lines. It must not be assumed that the present position was unsatisfactory. The year 1928 had been another year of progress; the financial position had improved, the membership had increased, the popularity and usefulness of the meetings had not diminished, and the committee looked forward to a successful and creditable year of work in 1929. (Applause.)

When the Group was formed, it was proposed to hold conferences; to issue chemical engineering data in the form of data sheets; to form a technological library; to assemble a library of catalogues of chemical engineering plant; to set up a bureau of information on chemical engineering subjects; to establish an inquiry office; to assist educational bodies in devising schemes of education on chemical engineering subjects; to direct or assist in directing research on chemical engineering matters; to interest itself in standardisation; and to co-operate with other societies for their mutual benefit.

The Institution and the Group

Most of these things had since become the prerogative of the Institution of Chemical Engineers, and such a transfer of activities from the Group to the Institution was to be expected. A great many people had thought that the Group would have no useful place at all in the body of scientific societies after the Institution of Chemical Engineers had come into being (the first meeting of the Institution was held under the auspices of the Group in 1920), but both bodies had made progress. The Group was so well established and was making such progress that it would be folly to think of doing other than continue its work. The Group had worked in co-operation with the Institution and other bodies, and he suggested that if possible it should work in much closer contact with the Institution even than it had in the past, and in much closer union with the parent Society. The Institution and the Group shared common offices, and that had been found, by both organisations, to be extremely useful.

Referring to the movement to house a number of the scientific societies in a common building in London, he said he would like the Group to be included among those societies. If the Society, the Group, and the Institution were associated together on the same floor of a building, economy in common services would be effected, and there would be better co-ordination of their several activities. He considered that the representation of the Group and the Institution on the council of the Society and of the Society on the Institution council, and so on, should be much more official than it was at present, and that the Society, the Group, the Institution, and the Coke Oven Managers' Association should be much more closely associated than they were at present. There should be greater co-operation among all those bodies with regard to meetings, and anyone who was qualified to be a member of the Institution, the Coke Oven Managers' Association, and the Society should be able to become a member of all three bodies at an inclusive fee, which would be considerably less than the total of the three separate subscriptions. The Society's *Journal* could be improved by co-operation. Even if a man did not wish to be a member of the three organisations, he should be given access, on special terms, to the publications of those bodies of which he was not a member. There should be more joint meetings, and more meetings in the provinces with the provincial sections—a policy which had been pursued by the Group. He advocated a great deal more beating of the big drum in the market place, and the Society was the body that could best do it. No one would deny the importance, from the Society's point of view, of extending its influence, thereby benefiting the Group, the Institution, and, ultimately, the science and practice of chemical engineering in this country.

Above all, it would help to secure for those engaged in chemical industry, especially on the technical side, that public and commercial recognition which was rightly their due, and which they were almost too modest to claim. (Applause.)

Dr. Levinstein's Hopes of Expansion

Dr. H. Levinstein (President-Elect of the Society), commenting upon the chairman's remarks with regard to the improvement of the *Journal*, suggested that representatives of the bodies concerned should arrange to meet him and to discuss the matter in detail. The *Journal*, he said, was not merely a national but an Empire organ, for there were sections of the Society all over the Empire as well as in America, and he urged the importance of linking up the Society and its sections throughout the Empire more closely through the medium of the *Journal* and by other means. There were at present no definite means of linking up the outposts of the Society with the central organisation, and he was determined, if he could obtain the necessary support, to establish an overseas department which would not only look after overseas friends when they came to this country, but would arrange for personal visits at least every alternate year to even the most distant sections, thus linking them up with the homeland more closely, interesting them in the Society, securing new members, and acquiring a mass of information on the developments of chemistry, chemical industry, and chemical engineering in the outlying parts of the Empire such as could be attained in no other way. In that he hoped to have the co-operation of the Group, which was a most virile body, and was in every way an ornament to the Society.

The proposed scheme to house the various scientific bodies in one building, which he sincerely hoped would become a practical proposition, would help enormously. He was particularly anxious that the ordinary works chemists, scattered all over the country and the Empire, should have access to all the publications of the various chemical and semi-chemical societies at an inclusive and very much reduced subscription, including the reports on applied chemistry.

More Groups Wanted

Mr. Arthur J. Reavell (President of the Institution of Chemical Engineers) acknowledged the value of the Group's work, and said it was due to the unremitting efforts and extraordinarily good work of the originators of the Group that the Institution had come into existence. In view of the success of the Group and of the help it had afforded the parent society, why should there not be other Groups? He saw no reason why there should not have been a Coke Oven Managers' Group of the Society, a Fuel Group, a Bio-chemists' Group, and so on. Emphasising the benefits which resulted from the holding of joint meetings, he said he believed the Institution would be ready at all times to help in the arrangement of such meetings for the mutual benefit of all concerned. With regard to the Chemical Engineering Group, he felt that it had a great work before it; he did not fear that it would clash with the Institution, but believed that the two could help each other. Papers could be presented to the Group of a character which could not be presented to the Institution, and *vice versa*. Because a paper could not be presented to the Institution, it did not follow that it was not helpful to business and industry. He wished the parent society and the Group the greatest success in the future.

Support for Dr. Levinstein's Scheme

Mr. G. W. Gray urged that the parent Society, the Group, the Institution, and the Coke Oven Managers' Association should co-operate with Dr. Levinstein in establishing his proposed scheme for linking up developments throughout the Empire, and in this connection he urged that the technical men should carry with them their non-technical colleagues. They had to rely to a very great extent upon the salesmen, and surely it would be possible to devote some part of the *Journal* to giving them a greater interest in and inside knowledge of the technical problems involved than they had been given hitherto. The attention of chemists should also be directed more definitely to the scientific measurement of costs in factories, and they should be encouraged to devote more attention to it, rather than that it should be left to the accountants, who could only view if from the accountants' point of view. With co-operation between the various bodies concerned with chemistry, chemical industry, and chemical engineering, it might be possible in the future to establish a publications department for the various journals, so that each could be produced with a view to interesting, first, those concerned with the academic side; secondly, those concerned with the general chemical side; thirdly, those concerned with chemical engineering, and lastly, those concerned with administration.

Work of National Importance

Mr. P. Parrish agreed that the Group had justified its existence, and pointed out that those who were prominent members of the Group had been closely identified with the outstanding chemical activity of the last ten years. The work of those members had been work of national importance. If one were to judge of the success of the Group, it was not sufficient to consider it only from the point of view of its academic success, but also from the point of view of its material success.

Fertile Ideas from Overseas

Mr. E. A. Alliott, emphasising the importance of the scheme proposed by Dr. Levinstein for maintaining contact between the Society and its overseas sections, said there were a great many fertile ideas to be found abroad which would be valuable to their industry, but the chief advantage which would accrue from the visits of representatives from this country to the overseas Dominions was that ultimately they would bring more trade to this country. Discussing the activities of the Institution of Chemical Engineers and the Chemical Engineering Group, he said his conception was that the Institution should present the more highly technical papers, describing technical advances in various industries in a manner which appealed to people with considerable technical education and experience, whereas the Group should present papers describing the actual results of new developments in industry and how they affected business people, in such a way that, whilst they were to some extent technical, they could be understood by those who had not a very deep knowledge of the technicalities of the industries concerned. Thus, both bodies had independent fields, but each was necessary to the other.

Industrialists' Suspicion of Scientists

Dr. S. G. Barker said that the Group could be of great assistance to those who were concerned with the introduction of science into industries, because scientists were sometimes regarded by industrialists—and not without some justification—as unpractical. A good deal of the trouble was due to the feeling in some quarters that the desertion of academic for industrial life meant a distinct degradation of one's professional status. That feeling, however, must be killed. He agreed that there were plenty of fertile ideas abroad, but there were more at home, and the Group, before going abroad, ought to see England first. One of the difficulties encountered in the application of science to industry was due to the fact that in some industries there were few who could interpret the results of research in order to apply them on a bulk basis. If the chemical engineer could show how that could be done, he would be doing more for industry than one could describe. He felt that a duty of the Group should be to advise research workers in this country how to adapt their results on the large scale, and in that way it would be doing a very practical work for industry. The Group could also influence very materially the training of young chemists and chemical engineers. In his view, the industries of this country had never had the benefit of the best brains, because there was no security of tenure. If the Group could convince our industrialists that scientists in industry—and chemists in particular—were not a luxury, but an absolute necessity, and that their services should not be dispensed with on the first demand for economy, it would be doing a great work.

Splendid Team Work

Mr. F. E. Hamer (invited by the Chairman to contribute to the discussion) said that when called upon recently by a visitor who was associated with chemical engineering and mining interests in Australia, and who was anxious to obtain information as to the holding of conferences and the organisation of chemical engineers in England, he had supplied him with copies of agendas of the conferences organised by the Group, which appeared to be models of what such programmes should be. He had also put the visitor in touch with Mr. Mackie, with the confident knowledge that he would receiv

every assistance. He mentioned this as one simple incident to show that the organisation of chemical engineering in this country was attracting attention overseas, and that the group had supplied an excellent model for the establishment of similar organisations elsewhere. In view of the great constructive work that the Group had accomplished, it was surprising that anyone should think of questioning whether it had justified itself. Within a few years they had seen a bare idea, which at first was treated almost as a joke, converted into a very vigorous reality, and chemical engineering recognised, in its flourishing Institution, as a new and most important science. Their success was due to the unselfish spirit in which they had all worked for entirely impersonal ends, their splendid team work, and the absence of petty rivalries. It was due also to the great ability with which their oganisation had been conducted. They had shown themselves to be real engineers, by making such a thoroughly sound engineering job of both the Group and the Institution. Their past success supplied them with the best possible programme for the future.

Group's Identity to be Retained

Dr. W. R. Ormandy pointed out that a number of separate institutions now existing could have been organised as sections of the Society of Chemical Industry instead of as separate institutions if the Society had taken the opportunity to organise them, and they would have been just as conducive to the health of the Society as was the Chemical Engineering Group. Any attempt to merge the Group into the Society so that it would lose its identity would, in his view, be ill-advised. Stressing the importance of co-operation between existing societies, he said it was impossible under present circumstances for a man who was a member of a number of societies to attend all the meetings he would like to attend. It was annoying to find that a paper which was of interest to many societies was often read before the members of one comparatively small society only, and he hoped that if the proposal to house a number of societies in one large building was successful, it would become the practice to hold joint meetings more frequently, so that all who were interested in one particular paper would have an opportunity of attending the meeting at which it was to be presented. He also hoped that the daily Press would devote a little more attention than they did to scientific and technical matters.

The Spirit of Camaraderie

Professor J. W. Hinchley paid a tribute to the work of the Group, and attributed its success to the spirit of camaraderie which pervaded its members and to the fact that they had the will to succeed. The Group could never hurt the Institution, but the two bodies would help each other. The Institution was a body for chemical engineers, for qualifying purposes, whereas the Group was a general educational body in respect of chemical engineering. Given the same spirit in the future as in the past, its prosperity would be still greater than it had been in the past, and ten years hence we should wonder why on earth anyone should have thought that its purposes had been achieved and that it need not continue to work. He had ideas as to how the Group could assist further in the development of the science and practice of chemical engineering, but would put those ideas before the Committee.

An Invitation to Liverpool

Mr. Gabriel Jones (Secretary of the Liverpool Section of the Society of Chemical Industry), expressed thanks to the Group for the hospitality extended to the representatives of the various sections, and on behalf of the Liverpool Section he extended an invitation to the Group to arrange a meeting in Liverpool.

Mr. George Gray (Vice-Chairman of the Group) intimated that the Group would gladly accept the invitation.

Death of Lady Perkin

Lady Perkin, widow of Sir William Henry Perkin, F.R.S., the eminent chemist and founder of the coal-tar colour industry, died at 25, Cleveland Square, London, on Monday, in her 90th year. She was Alexandrine Caroline, youngest daughter of the late Ivan Hermann Mollwo, and was married to Sir William Perkin as his second wife in 1866. Sir William Perkin died in 1907. Dr. W. H. Perkin, the Waynflete Professor of Chemistry at Oxford, is a son of the first marriage.

Silver Model of Imperial Chemical House

Presentation to Sir Frank Baines

Sir Frank Baines, the architect, who carried out the design and construction of Imperial Chemical House, Millbank, was entertained to lunch on Thursday, May 9, by the directors of the company. There were present Lord Melchett (chairman), who presided, Sir Harry McGowan (president), the Hon. Henry Mond, Lord Reading, Lord Birkenhead, Sir Max Muspratt, Dr. Clayton, Messrs. Mitchell, Nicholson, Rogers, Wadsworth and Solvay (directors), Mr. Janssen (of Brussels), Dr. Coates (treasurer), Mr. Dickens (secretary), and Major-General Duncan (head of the Staff and Establishment Department).

Lord Melchett stated that he was very glad that the occasion provided Mr. A. B. Purvis, of Canadian Industries, Ltd., with the opportunity of meeting the other members of the board. He had met Mr. Purvis in Canada, and the company felt assured that in his hands the future of a chemical industry in Canada was safe. Mr. Purvis replied briefly, and said that in his great country of Canada, Imperial Chemical Industries had foreseen the possibilities of development. He was going back to Canada convinced that the courage and vision of those directing Imperial Chemical Industries would enable the awakening spirit of his country to establish itself in practical affairs.

Lord Melchett then said that it was his very pleasant duty to present to Sir Frank Baines, on behalf of the directors of Imperial Chemical Industries, a model of Imperial Chemical House, which they desired him to accept as an appreciation of respect and admiration for the building which he had constructed. He had recollections of the great services which Sir Frank Baines had rendered during the war in the construction of factories designed for producing the requisites necessary for winning the war. Sir Frank Baines had never spared himself in the execution of his duties either in war or in peace. When Imperial Chemical Industries determined to build a new head office Sir Frank was the obvious person to whom they turned. The new building was not only an example of beauty, but a wonderful example of what British craftsmanship could achieve.

Sir Frank Baines, in his reply, stated that Lord Melchett had always made exceeding demands for rapid completion of work during the war. He had been equally insistent upon achievement on the new building. Mr. Henry Mond, who had been in direct consultation day by day, was largely responsible for the final result. He desired to thank the directors for the charming gift which they had given him.

The presentation consisted of a sterling silver model of Imperial Chemical House, which is described by experts as an excellent example of the art of the silversmith. The model includes all the essential architectural and other features (including carving) of the building, and was executed by the Goldsmiths and Silversmiths Co., Ltd., in record time. It is another example of the craftsmanship of British workers which has been exemplified in sculpture, carving, woodwork, metalwork and design in Imperial Chemical House.

Trade Waste and River Pollution

An interesting report on the activities of the Birmingham and District Joint Committee concerned in the improvement of the River Tame was presented at the annual meeting on Thursday last. Good progress has, it is stated, been made in the work of preventing the pollution of the streams by the discharge of liquid trade waste. This has been made possible chiefly owing to the sympathetic attitude adopted by the local authorities towards their traders on the important question of the admission of liquid trade refuse to the public sewers, and it is pleasing to observe that several local authorities who have in the past objected to the presence of trade waste in their sewers have recently reversed this attitude. The engineer to the Birmingham, Tame and Rea District Drainage Board has reported upon the improvement in the condition of the River Tame and upon the consequent necessity for raising the standard of purity of the effluent discharged to the river from the Board's works. As a result of this, the Board is proceeding to increase the capacity of the bio-aeration sewage purification installation from 7,500,000 to 20,000,000 gallons.

Painting as it Affects Railways

Chemical Opinions on the Nitrocellulose Lacquers

In a paper on "Painting as it Affects Railways," which Mr. Frank Fancutt (a chemist on the L.M.S. staff) read before the Oil and Colour Chemists' Association, reference was made to the merits and demerits of nitrocellulose lacquers and to the relative advantages of the spraying, flow-on, and other methodsof application.

A SPECIAL general meeting of the Oil and Colour Chemists' Association was held at the Institute of Chemistry, 30, Russell Square, London, on Thursday, May 9, with Dr. J. J. Fox (president) in the chair. A number of alterations in the rules, which had been made in accordance with the wish expressed at the tenth annual general meeting held last year, to enable members to record their votes by means of a postal ballot, were adopted. Subsequently, the president presented a volume containing the Association's journal for three years to Mr. John Parrish, this covering the period of Mr. Parrish's services as hon. assistant editor.

A Railway Chemist's Experiences

An ordinary general meeting then followed, at which a paper on "Painting as it affects railways" was read by Mr. Frank Fancutt, who stated that the paper was based solely on his experience with the L.M.S. Co., as the chemist in charge of their painting department, which included locomotives, carriages, wagons, bridges, ships and even furniture.

Dealing first with paints for railway carriages, it was pointed out that they must be elastic and remain so for the maximum period. The strains and stresses occurring during the working of railway carriages were unlike those met with on any other types of transportation vehicles because the strains and stresses were reversed by the directional working of the trains. Moreover, the climatic conditions were very much more severe, as carriages sometimes were left standing for long periods in exposed places, and they had also to do a great deal of tunnel working where the atmosphere was often sulphurous and in some cases distinctly acid. The greatest evil in painting this type of vehicle was moisture, and this was not confined exclusively to atmospheric moisture. A railway carriage was cleaned every day with water, and at frequent intervals with cleaning solutions which might be of an acid or alkaline character, and the danger from these was apparent. It had been the practice to paint the inside of the body with long-oil paints containing red lead, and, in some cases, acid-resisting paints, and these had been fairly successful under given conditions. Experiments, however, had recently been conducted with emulsified bitumen solutions, and although it was too early to form a reliable and definite opinion, the indications were that these might prove more effective.

Paints for Railway Carriages

The body of a railway carriage received 14 coats of paint, including three or four coats of varnish, and the latter must be of a very high quality, since during washing and cleaning the paint work was subjected to considerable abrasive action from scrubbing with brushes. The finished colour of railway carriages depended entirely upon the colour scheme in each particular case, but the crimson lake colour which had been in use by the L.M.S. for a very considerable time was a mixture of cochineal and alizarine lake. The painting of locomotives was very similar to that of carriages, except that more reliance was placed on the protection afforded by the varnish rather than the under-coats. The painting of ships presented more problems than any other branch, and the materials used must be of a higher quality. The greatest satisfaction with any ships' paint could only be obtained with long-oil paints, since the expansions and contractions were more varied than those met with on vehicles used for land transport.

Mr. Fancutt said he had for several years conducted exposure tests under actual working conditions with paints containing varying proportions of wood oil, and in most cases these had withstood the weathering conditions much better than straight linseed oils and enamels. These paints had also behaved quite satisfactorily when used as funnel paints where the temperature did not exceed 150 deg. C. The paints used for the protection of service pipes were mixtures of red lead and zinc oxide in the proportion of 2 to 1, and these had been found to be more serviceable than the mixture of red lead and white lead previously used. The use of white lead had now almost completely disappeared on the L.M.S. boats and had given way to zinc oxide and composite pigments. The use of bitumen paints on the ship's skin had not been encouraged since, whilst many were very good preservatives, others, in the author's experience, did not possess the elasticity claimed for them, and nearly all had encouraged the growth of fungus.

Materials used by the Permanent Way and Engineering Sections had changed but little during the past quarter of a century. The majority of the paints were made from red and white lead, and the large variations in the types of work involved did not lend themselves to the adoption of the improved methods now in force in many other railway departments, although it was thought probable that more work could be carried out by spraying.

Nitrocellulose Finishes

Generally speaking, the spray painting of railway vehicles had not been extensively developed, owing to the cost of installing the necessary plant and booths. A certain amount of spraying had, however, been carried out at stations and waiting rooms. Whilst the use of nitrocellulose finishes had increased during the past few years on railways, it was at the moment confined almost entirely to clear wood finishes. The pigmented type of finish has not proved successful on railway carriages, chiefly owing to the number of mouldings and projections on the body work. The clear wood finishes had almost completely superseded French polish for interior decoration, with fairly satisfactory results.

Special reference was made to the fact that some of the cellulose lacquers now made contain only one-third the amount of actual nitrocellulose that the original lacquers contained. The durability of the present type was regarded as very problematical, and the hardness of the finished film was only slightly greater than a good spirit finish. It therefore seemed probable that it would not be possible to "revive" the present finish to the same degree as the old one, and, in that event, the process would prove more costly. It seemed desirable to stipulate the nitrocotton content of these finishes, together with hardness and elasticity tests, and this was being considered at the moment. The conditions under which these finishes were tested on railways were so severe that manufacturers could be assured that if they were suitable for railway requirements they were not likely to fail on other work.

Points in the Discussion

The president, in congratulating the author on an exceedingly useful paper, suggested that the results of the exposure tests should be presented to the Association at a later date.

Mr. T. H. Adams (L.M.S. Railway), who said he was engaged on the analytical side, said that the protection of iron work by red lead or bituminous paints was a very vexed one and had been the subject of many experiments by the staff of the L.M.S. over a long period. The standard paint adopted by the L.M.S. for this purpose now was genuine red lead ground in boiled linseed oil and thinned down with raw oil to a density of 35 lb. per gallon. Copperas oxide and bitumen solutions had stood up fairly well, but he had not found anything with one-tenth the life of red lead.

Mr. C. A. F. Hastilow said the author had not mentioned painting by dipping, although there were a large number of articles forming constituent parts of railway carriages which could be treated by that way. The nitrocellulose content of lacquers was intimately bound up with the question of price. That was the reason why the nitrocellulose content was decreased and the gum content increased. The flow-on process gave extraordinarily good results, but he wondered whether it really was a better process than spraying.

Mr. Fancutt said that he had only dipped small articles of iron work, and the paint used was red oxide with 5 per cent. zinc oxide added. The flow-on process had only been applied to wagons, and tests had shown that the results were as durable as with a similar brushed paint.

Basic Industrial Minerals: No. VII.—Leucite

By G. Malcolm Dyson, Ph.D., A.I.C.

THE problem of the extraction of potash from mineral materials has always been an important matter in the heavy chemical industry, and during the war various methods were put into commission in order to augment our supplies of potash cut off on account of hostilities with Germany, until then the greatest producer of potassium salts. Many of these methods, such as the extraction of potash from seaweed, from blast furnace flue dust, from the residues of beet-sugar extraction, etc., have been abandoned in times of peace, and the enormous and readily accessible resources of the Stassfurt deposits have gradually eliminated almost every other producing unit, as far as the potash industry is concerned. There is no really sound geological reason for this state of affairs, since potash is fairly widely distributed in Nature, and the felspathic minerals, of which an enormous supply is available, all contain more or less potash. The problem is a chemical one—namely, how to obtain the potash in a soluble form from the rocks which contain it. It is in this connection that the mineral leucite offers such startling possibilities.

The Possibilities of Leucite

Leucite is a potassium aluminium silicate which when absolutely pure corresponds to the formula $K_2O.Al_2O_3.4SiO_2$. On the very rare occasions when it is found pure, it forms white or grey trapezohedral crystals, which have a hardness of 5·5 to 6, and a specific gravity of 2·5. The refractive index is 1·5. Leucite is not, however, often found in a pure condition; it is one of a very large family of rocks—the complex silicates—and even the sub-section to which it belongs in this family—the alkali gabbros—contains many hundred distinct species. In the first place the alkali may be potassium or sodium, or a mixture of both in any proportion, and in the second place the leucite grains may be disseminated throughout the matrix of other minerals. This is noticeable especially in the plutonic rocks, many of which have a granitic texture and contain much alkali felspar. Many of the lavas contain a certain amount of leucite, as may be seen from the illustration Fig. 1, in which a leucite-containing rock from Vesuvius is shown in section. There are two types of crystalline mineral embedded in a microlitic ground mass. The two minerals referred to are augite, which shows up as long needle-like masses, and leucite, which occurs as almost octagonal grains disseminated throughout the whole of the section.

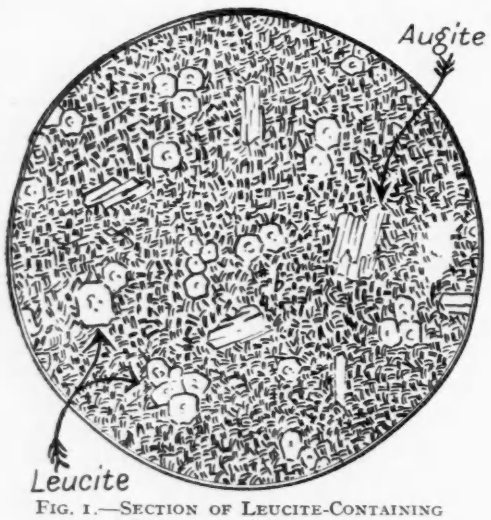

FIG. 1.—SECTION OF LEUCITE-CONTAINING ROCK FROM VESUVIUS.

When these grains are extracted and analysed they show the following:—

	Per cent.
Potash (K_2O)	21·5
Alumina (Al_2O_3)	23·5
Silica (SiO_2)	55·0

showing that they approximate very closely to the typical formula quoted above.

Chemical Treatment of Leucite

The advantages which attach to the use of leucite in the preparation of potash derivatives are partly mechanical. When the majority of minerals of the potassium-aluminium silicate type are dissolved up in dilute acid, the silica remains as a gelatinous mass, which is almost mechanically intractable and incapable of filtration. When leucite is treated with dilute acid this phenomenon does not occur; the rock-mass gives up its potassium and aluminium without the disintegration of the siliceous skeleton, which remains intact after the treatment with acid. The actual process, many of the developments of which are due to Baron Blanc and the Società Italiana Potassa, is run along the following lines. The leucite is laid down in the form of a rough bed, and sulphuric acid diluted with the mother liquor from a previous operation is run on to it. The solution of the alkaline constituents of the leucite is an exothermic reaction, and raises the temperature of the extracting liquor to about 70° to 80° C. Both metallic constituents of the leucite dissolve as the sulphates, and matters may be so arranged, with regard to the concentration of the extracting acid, that on cooling the filtered liquid from the extraction bed, alum, $K_2SO_4.Al_2(SO_4)_3.24\,H_2O$, separates out in the crystalline form.

This process, which operates for alum, has several important advantages. In the first place, as previously mentioned, the silica retains its skeletal form, and does not disintegrate. After the acid extraction, this residue is washed with hot water, thus furnishing a wash liquor which will serve for the dilution of more acid for the next extraction. The silica may be treated in one of two ways; it can be dried, ground, and separated from the larger particles by air flotation; the product so obtained is an excellent material for the preparation of cleansing powders, where a mild abrasive quality is required. From the chemical standpoint, the use of the silica in the production of water-glass is more interesting. It has been observed that the siliceous residue from the acid extraction is soluble, almost without further heating, in strong caustic soda solution, and furnishes a water-glass of very high quality. In this way the whole of the constituents of the leucite are utilised.

Operating for Chlorides

It will have been observed that the process mentioned above has as its final product potassium aluminium sulphate, for which there is only a limited demand; many of the requirements of the chemical industry are for potassium chloride. It is of interest to note that the process just described can be operated in an ingenious fashion for the production of both potassium chloride and metallic aluminium. The extraction with hydrochloric acid proceeds equally as readily as that with sulphuric acid, the soluble products being potassium and aluminium chlorides. These, of course, do not form a readily crystallisable product, and must be separated in the following way: The solutions containing them are used as the dilution liquor for further extractions until they have accumulated a high concentration of soluble chlorides. They are then evaporated to dryness, and the residual matter gently heated. During the evaporation and heating the aluminium chloride decomposes with the formation of insoluble aluminium oxide and hydrochloric acid gas. The latter is, of course, dissolved in water and used for a fresh extraction, whilst the potassium chloride, which has been unchanged by these operations, is leached out with water and crystallised in the usual way. The aluminium oxide which remains behind is suitable in every way for the production of metallic aluminium.

One small matter is the introduction of iron during the various operations connected with this extraction. Most deposits of leucite contain a little iron, and it becomes necessary to remove this, together with that which is introduced with the hydrochloric acid. A very simple method is found to be sufficient; the hydrochloric extraction liquor is passed through a bed of fresh leucite without the addition of further acid. A reaction which is, in many ways, parallel to the

"base-exchange" reaction of the permutite water softener, takes place, the iron in solution being replaced by aluminium.

The utilisation of leucite which, from consideration of natural supplies, is carried on in Italy (although there are good leucitic deposits in the U.S.A.) is one of the chemical industries that have sprung up since the war with astonishing rapidity. In 1926 the Società Italiana Potassa were treating about 1,500 tons of prepared leucite monthly at their Roccamouffia works. The present monthly amount is in the neighbourhood of 10,000 tons, about three-quarters of which is worked for soluble aluminium and potassium compounds. In addition, the deposits at Cenzio are being worked by the S.I.P.E. (Società Italiana Prodotti Esplodenti).

The enormous potential supplies of potash that are to be obtained from the granitic rocks tempt one to prophesy that in the future we shall obtain, not only our potash, but also our aluminium from such complex silicates. It is of interest to note that the mineral leucite has one or two uses other than those specified above. It may be crushed, subjected to electro-magnetic separation, and in the form of a fine powder it is used as a potash-bearing fertiliser. It has been complained that the use of leucite in this manner does not make a large supply of potash immediately available in the soil, as is the case where kainite is used. This is, in actual fact, an advantage; the slow liberation of potash merely means that the leucite is acting as a reservoir of that essential element, which is absorbed by the vegetation almost as fast as liberated.

Lovering China Clays, Ltd.

Issue of Shares

On Tuesday, there was an issue at par of 380,000 shares of £1 each and £250,000 of 6 per cent. registered debentures of £100 each at 96 per cent. by Lovering China Clays, Ltd. The company was incorporated on May 3 to acquire as a going concern and develop the business of John Lovering and Co., China Clay producers and merchants, of St. Austell, Cornwall, and a freehold property connected therewith. The directors of Lovering China Clays, Ltd., are Mr. A. B. Williamson (chairman), who is also chairman of the Olympic Portland Cement Co., Ltd. and partner in the firm of Balfour Williamson and Co.; Mr. J. Lawson; Mr. W. T. Lovering, late managing partner in the firm of John Lovering and Co.; Mr. E. J. Hancock, managing director of West Carclaze China Clay Co., Ltd.; Lt.-Col. R. G. Ritson; and Sir Charles Coupar Barrie.

John Lovering and Co.

The abridged prospectus states that the business of John Lovering and Co. is old-established and well known. It has been a private firm in the hands of one family for many years, and has yielded profitable results. For family reasons it has been decided to dispose of the undertaking. Continuity of management and of interest will be ensured by the inclusion of an active and experienced partner of John Lovering and Co. on the board of the company, and by the subscription in cash on the terms of the prospectus for not less than 75,000 shares of the company by members of the family. Balfour Williamson and Co. have entered into contracts for the acquisition of the business of John Lovering and Co. and for the whole share capital of Meledor Estate, Ltd., and these contracts will be transferred to the company.

The mines or pits of China Clay and the kilns and other works to be acquired by the company are situated in the neighbourhood of St. Austell, and the prepared clay is shipped either at Fowey, Charlestown or by rail. China Clay is a commodity which varies considerably in quality. The high qualities are in limited supply and command a substantial premium. High quality clay is almost a monopoly of a few sources of supply, and for this quality the mines and works of John Lovering and Co. are celebrated. Their clay is not only used in Great Britain, but is largely shipped to other parts of the world.

The company will acquire the whole of the issued share capital of Meledor Estate, Ltd., which owns the freehold of valuable China Clay properties partly leased to John Lovering and Co., partly to other China Clay producers, and partly held in reserve. The vendors of the shares are members of John Lovering and Co., and it was considered advantageous in the interests of Lovering China Clays Ltd., that control of these freehold properties should also be acquired. The reserves of China Clay in these properties are very large, and they are capable of practically unlimited development.

Production and Uses of China Clay

Mr. E. J. Lewis, M.Sc., A.I.C., clay technologist and analyst, St. Austell, has provided the following information:—

China Clay is chiefly used in the manufacture of paper (as a filler or a component part of the paper in combination with wood-pulp, etc., and for coating and enamelling), pottery goods (in the body of the ware as well as for coating for ware made of fire clay and other materials of a low colour), and textiles (for loading and sizing of cotton goods and other materials requiring a smooth finish), and also in a lesser degree in the manufacture of imitation leathers, linoleums and oil cloths, rubber goods, asbestos goods, ultramarine and dyes, inks, paints, crayons and lead pencils, wall coverings, lubricants, water softeners, leather goods, shoe polishes, metal polishes, shoe cleaners, confectionery, chemicals, soaps, picture frames, explosives and fuses, annealing powders, cosmetics, medicines, patent foods and for oil refining. Out of the total used of approximately 800,000 tons per annum, 450,000 tons are used in the paper industry, 250,000 tons in pottery, 50,000 tons in textiles, and the remaining 50,000 tons in other industries. The Board of Trade return for the production of China Clay for 1927 was 920,074 tons, 1928—817,764 tons; China Stone, 1927—54,551 tons; 1928—48,111 tons (price increases for 1928 were notified in 1927. Many purchasers laid in stocks in September to December 1927, and hence the figures 920,074 tons for 1927 and 817,764 tons for 1928 should be averaged). Exports to the U.S.A. for three years up to and including 1921, 1924 and 1927 averaged per annum respectively 234,766 tons, 324,853 tons, 335,928 tons.

The properties of John Lovering and Co. have been surveyed by Mr. N. F. Bellamy and Mr. R. M. Richards, of St. Austell, and they value the property of the going concern at £638,021, which includes no sum for goodwill. To this valuation falls to be added the value of the shares in Meledor Estate, Ltd., bought for £52,602. After payment for these properties, preliminary expenses, etc., the company will have cash estimated at £41,000. The grand total of these figures is £731,623.

Purchase Price and Proceeds of Issue

Balfour Williamson and Co. have entered into contracts for the acquisition of the business of John Lovering and Co., as from January 1, 1928, for the sum of £500,000, and for the purchase of the whole of the share capital of Meledor Estate, Ltd., for £52,602, making a total of £552,602.

These contracts will be transferred to the company on original terms, subject to the payment to Balfour Williamson and Co. of £5,000 in cash to cover their expenses in connection with the negotiations of the contract up to and including November 30, 1928, and the allotment to them or their nominees of 20,000 ordinary £1 shares in the company, credited as fully paid, as remuneration for their services. The company will be entitled to the profits of the businesses from January 1, 1928. The goodwill both of John Lovering and Co. and of Meledor Estate, Ltd., is included in the assets which the company will acquire, and as the value of the assets, exclusive of goodwill, exceeds the purchase price, no part of the price will be attributed to goodwill. The proceeds of this issue will be applied in payment of the purchase price of the businesses under the contracts mentioned in the prospectus and in the payment of the preliminary expenses of the company, and of the various expenses payable by the company in connection with the acquisition of the businesses. After making these payments the directors are of opinion that the proceeds of this issue will be sufficient to furnish the company with the requisite working capital for the effective carrying on of the businesses, and also for the carrying out of certain improvements and developments.

The certified profits (before charging income tax and partners' salaries) of John Lovering and Co. varied from £60,969 in 1923 to £55,966 in 1928, and those of the Meledor Estates, Ltd. (formed in 1924) from £2,261 in 1925 to £2,085 in 1928. The combined profits for the year to December 31, 1928, amounted to £58,051.

The output of China Clay and minimum price are regulated by the China Clay Association, of which the company is a member. There is considerable scope for increased profits through improvements, reduced cost of production, etc.

Merchandise Marks for Glassware

Continuation of Inquiry

FURTHER evidence with regard to the marking of imported glass bottles and containers was given on Monday before the Board of Trade Committee which is inquiring into the application of the British glass manufacturers for a marking order for a number of types of imported glassware. Evidence was given on behalf of the beer, wine and spirit trade, and also the manufacturers of foodstuffs, confectionery, etc., which is packed in glass containers. This was all to the effect that to mark imported bottles or containers would disfigure the article and prejudice sales.

Syphons

Lt.-Col. O. L. Eugster, chairman and managing director of the British Syphon Co., Ltd., opposing the application as regards syphon vases, said that his company was by far the largest manufacturers of syphons in the world. Before the war he used to import well over one million syphon vases per annum, but this had now been reduced, owing to the tax on soda water and the high price of whiskey, to about half a million. There were no manufacturers of syphon vases in this country, said witness, and for that reason alone he contended that the marking of imported syphon vases was unnecessary. He pointed out that a syphon vase has to withstand very great pressure, and as they are sold up to a capacity of 44 oz., the glass has to be of a particular strength which could only be obtained by hand-blowing and, to the best of his knowledge, by using a particular sand which was only obtainable in Czechoslovakia.

Some 40 years ago his company started a small factory in England and imported labour from Czechoslovakia, but the results were disastrous. The fact that syphon vases could only be made in Czechoslovakia had been realised in the Irish Free State, where syphon vases were the only bottles imported free of duty, and the same applied, more recently, to Australia. During the war, the syphon makers in the United States, not being able to get their supplies from Czechoslovakia got into touch with the largest glass firms in the United States, who attempted to make them. At the present moment, however, in spite of a 60 per cent. duty, 90 per cent. of the syphon vases used in America were imported from Czechoslovakia. A syphon vase represented roughly one-fifth to one-eighth of the cost of the complete syphon, and if these vases were branded "made in Czechoslovakia" it would ruin the syphon-making industry here, because users of the contents might be led to believe that the contents were made in Czechoslovakia.

Cross-examined by Mr. Wethered, who appeared for the applicants, witness said he imported the vase and the glass tube, but made and fitted the porcelain and metal portions of the syphons, using Cornish tin for the latter.

Mr. Wethered: "Suppose the vase were marked 'glass foreign,' how would that affect you?"

Witness replied that the public would inevitably be led to believe that the contents of the syphons were also foreign.

Mr. Hailwood, of Hailwood and Ackroyd, Ltd., glass manufacturers, questioned witness, and said that his factory was laid out for the manufacture of syphon vases, but there had never been an opportunity of making them. He had some Czechoslovakian glass workers in his employ, and asked witness whether he disputed that the same class of goods could be turned out in this country as in Czechoslovakia, seeing that there were some Czechoslovakian workers employed here

The Necessary Sand

Witness said he did dispute it as regards syphon vases, because that was a trade which was handed down from father to son.

Mr. Hailwood put it to witness that the sand in Czechoslovakia had nothing to do with the quality of the glass for this particular purpose. The Fontainebleau sand of France was equally good, and we had some excellent sand in this country.

Mr. F. C. Aslin, secretary of Stephen Smith and Co., Ltd., said his company had for many years enjoyed a very large proprietary wine trade, which included such well known brands as Hall's wine and Keystone burgundy, port and chablis, in addition to a general trade which did not bear a trade mark. For the purpose of their business, the firm imported from abroad a large quantity of bottles, although the bulk of their supplies came from home manufacturers. The reason for the imports was that the price of the foreign bottles is very much lower than that of the British article, and that was a factor which had been of considerable assistance in establishing the business. Witness expressed the very definite opinion that customers are concerned only with the contents of the bottles and were wholly indifferent to the origin of the bottle. On the other hand, if "Foreign" or "made in . . ." was stamped in a conspicuous place on the bottles, the public would inevitably think that the contents had been made abroad and that there had been a change in the policy of his company. That would have a serious effect upon sales.

Perfumery Bottles

In the course of the proceedings on Tuesday, evidence against the application for a marking order was given by representatives of the perfumery manufacturing trade. The witnesses were Mr. Horace Barrett (managing director of J. and E. Atkinson, Ltd., perfumery and toilet soap manufacturers), and Mr. Ralph P. Gosnell (managing director of John Gosnell and Co., Ltd., manufacturing perfumers and fine soap makers), both of whom are ex-chairman of the perfumery manufacturers' section of the London Chamber of Commerce. It was with the support and on behalf of this body that their evidence was given.

The arguments put forward by the witnesses against the proposal to mark were that the perfumery manufacturers, who were the actual users, knew the origin of the bottles, so that there was no deception; that the marking of the bottles with a mark of foreign origin would lead the public to believe that the contents as well as the bottles were foreign; that the fine quality bottles used in the industry, if marked with an indication of origin, would in many cases be irretrievably disfigured; and that there was complete inability on the part of British manufacturers of glass bottles to supply a very large proportion of the bottles and containers used by the perfumery industry, so that the perfumery manufacturers had no option but to buy from abroad.

The inquiry was adjourned until Monday, May 27.

The inquiry in regard to lamp-blown glassware and scientific glassware (which was separated from the rest) will be held at 11.30 a.m. on Monday, June 3, and at 10.30 a.m. on Tuesday, June 4, at the Board of Trade Offices, Great George Street, London, S.W.1. Communications should be addressed to the Secretary, Mr. E. W. Reardon, at that address.

Newcastle Chemical Industry Club

A PARTY of members and their friends, sixty-four in all, spent a remarkably enjoyable day on Saturday, May 11, visiting the Roman remains at Borcovicus during the afternoon and the Settlingstones Witherite Mines in the evening. The trip was made in cars belonging to members. The party owes a debt to Mr. Burleigh, assistant to Professor F. G. Simpson, of the Department of Roman Archeology, for describing with expert lucidity the significance of the ruins.

After tea at the Bowes Hotel, Bardon Mill, the members motored over to the Settlingstones Witherite Mines, and thanks to the courtesy of Mr. Tresdale, the manager, were introduced to all aspects of the works. It was surprising and gratifying to learn that these mines provide the world's biggest source of witherite (natural barium carbonate), which occurs there as a high grade deposit. The glorious weather, beautiful countryside and expert historical opinion, combined to provide the members with an outing pleasurable almost beyond precedent, and further excursions are eagerly anticipated.

Atmospheric Corrosion: Faraday Society Discussion

ON May 23, at 8 p.m., in the rooms of the Chemical Society, Piccadilly, London, following the Annual General Meeting of the Faraday Society, the Third (Experimental) Report to the Atmospheric Corrosion Research Committee of the British Non-Ferrous Metals Research Association, by Mr. J. C. Hudson, will be summarised by the author and will be followed by a general discussion. The report was published in No. 96 of the "Transactions" of the Society. Copies (price 5s. each) may be obtained from the publishers, Messrs. Gurney and Jackson, 33, Paternoster Row, London.

China Clay Exports—April, 1929

A RETURN showing the quantity and value of the exports of China Clay, the produce of Great Britain and Northern Ireland from Great Britain and Northern Ireland as registered in the month of April, 1929, is as follows :—

COUNTRY OF DESTINATION.	QUANTITY. Tons.	VALUE. £
Sweden	1,888	3,969
Norway	1,127	2,729
Denmark (including Faroe Islands)	29	83
Germany	3,418	7,327
Netherlands	3,840	7,849
Belgium	5,406	10,311
France	4,238	6,785
Switzerland	21	71
Portugal	71	198
Spain	2,305	6158
Italy	2,352	5,880
Greece	—	2
Bulgaria	2	24
China (exclusive of Hong Kong, Macão and leased territories)	4	20
Japan (including Formosa and Japanese leased territories in China)	53	676
United States of America	29,309	64,697
Cuba	5	20
Colombia	5	23
Brazil	1	5
Argentine Republic	515	2,056
Irish Free State	—	8
Union of South Africa—Cape of Good Hope	7	76
British India, via Bombay, via Karachi	200	860
Other Ports	2,398	6,776
Madras	40	180
Bengal, Assam, Bihar and Orissa	534	2,072
Malay States—Federated States	—	3
Australia	13	153
New Zealand	—	1
Deduct to correct January : Bengal	147	501
Total	57,634	128,511

China Clay Imports—April, 1929

A return showing the quantities and value of China Clay (including China stone) imported into Great Britain and Northern Ireland, as registered in the month of April, 1929, is as follows :—

COUNTRIES WHENCE CONSIGNED.	QUANTITY. Tons.	VALUE. £
Germany	3	29
United States of America	78	518
Total	81	547

The Price of Radium

IN the course of a letter to The *Daily Telegraph*, Professor F. A. Lindemann (who occupies the chair of experimental philosophy at Oxford) makes some comments on the price of radium. "Shortly after its discovery," he says, "radium was offered for sale in small quantities at a price of approximately £500 per gram. Since then new rich deposits of the ore have been discovered and more efficient methods of extraction developed. Many of the subscribers to the National Radium Fund must therefore feel some anxiety when they learn that the price asked to-day is in excess of £10,000 per gram. What reason is there for such an increase? One gram of radium may be extracted from less than ten tons of uranium ore. To crush and dissolve ten tons is not a very expensive proceeding. Even less costly is it to precipitate the radium and recrystallise the product. A charge of £10,000 per gram of radium can therefore only be justified if the ore costs nearly £1,000 per ton. Such a price appears so exorbitant that one is entitled to ask for an explanation before the enormous sums collected are disbursed. The demand for radium has admittedly increased, especially since its value in the treatment of certain cases of cancer has been brought home to a wider public. But that generous donors are willing to pay almost any price in order to ensure that sufferers should not be deprived of relief is scarcely an adequate reason for raising the price of uranium ore to such an extravagant figure."

Chemical Merchants' Affairs

THE affairs of the firm of S. H. Travis and Co., 33, King's Road, St. Pancras, London, manufacturing chemists, which carried on business as chemical merchants and against which a receiving order was made on July 12 last, came before Mr. Registrar Mellor in the London Bankruptcy Court on Tuesday, on the hearing of an application to approve a proposal which had been accepted by the statutory majority of the creditors. In reading his report on the application, Mr. D. Williams, Official Receiver, said that on July 27 last an order was made by the court adjudging bankrupt Sidney Herbert Travis, trading in partnership with another under the style of S. H. Travis and Co. An application for adjudication against Robert Walter Travis stood adjourned. The proposal provided among other things for the payment of a composition of 5s. in the £ on all provable debts except those in respect of which certain creditors had agreed to a reduction of the amounts respectively due to them, while two creditors with claims totalling £982 were to release their claims in entirety. The composition, together with attendant expenses, etc., was to be paid out of a sum of £1,500 to be secured by the guarantee of Albert Victor Cowell. According to the debtors' amended joint statement of affairs, the liabilities expected to rank amounted to £3,492, but from the proofs of debt lodged they would appear to total £7,871, the difference between the two figures being chiefly accounted for by a credit returned in the statement of affairs as contingent and not expected to rank having proved for £3,113. But the figure of £7,871 was reduced to £5,076 by creditors releasing their claims for sums amounting in all to £2,794. The joint assets were valued at £515, but the trustee had reported that they would not realise more than £161. The failure and insolvency of the partnership firm was attributed to the failure of a certain arrangement and law costs and to the stoppage of work consequent on a receivership action. S. H. Travis had asserted that he was not aware of insolvency until 1926, but the accounts so submitted to the Official Receiver disclosed a condition of insolvency from 1920 with a steadily increasing deficiency, and the debtor had attempted to explain that by stating that he always regarded one of the loan creditors for a considerable amount as unlikely to make any claim. The Official Receiver added that the proposal appeared to present advantages over an administration in bankruptcy, and his Honour made an order approving it.

Abortive Negotiations for Russian Aluminium Plant

NEGOTIATIONS which have been carried on during the past two years between Dr. Robert J. Anderson and the Soviet Government relative to the construction of an aluminium reduction works in Russia have come to an end. The parties to the negotiations were unable to agree on terms and details. The plans called for the design and erection of a works to produce about 10,000 tons of aluminium per annum, together with an alumina plant and carbon-electrode factory. Power was to be supplied from the Dnieperstroy hydroelectric plant, now under construction. Russian bauxite was to be used as the ore. A special process had been developed to treat this bauxite for the preparation of alumina. Plans were also in hand for the design and erection of rolling mills and other plants for the fabrication of aluminium and its alloys. Dr. Anderson spent several months in Soviet Russia in the summer of 1928, studying the problems involved in founding an aluminium industry for the country and discussing the general situation there with government officials.

Increase in Canada's Nickel Exports

CANADA'S exports of all grades of nickel in March amounted to 11,977,300 lb., valued at $2,709,759, against 10,132,500 lb. with a valuation of $2,166,061 in March, 1928. The greatly increased volume of exports of this metal is shown by a total of 33,315,500 lb. for the first quarter of the current year compared with 22,905,500 lb. in the quarter ended March 31, 1928. The value for three months this year is $7,319,339 compared with $5,221,054 in the corresponding period of last year. These figures represent a gain of 45 per cent. in volume and of 40 per cent. in the value of nickel exports from Canada. Exports of fine nickel particularly show striking growth, the exports of this grade in March at 6,967,900 lb. comparing with 4,160,800 lb. in March a year ago, a gain of 67 per cent.

From Week to Week

SUBSCRIPTIONS to the Thanksgiving Fund include £105 from Burt, Boulton and Haywood, Ltd.; Reckitt and Sons, Ltd., £500.

SIR MAX MUSPRATT has accepted an invitation to become president of the Liverpool branch of the Incorporated Sales Managers' Association.

DR. D. STOCKDALE, of King's College, has been appointed University demonstrator in the Cambridge University Department of Chemistry for three years.

RECENT WILLS INCLUDE: Dr. Paul Dvorkovitz (net personalty £2,890), £4,456.—Mr. Thomas Scott Forrest, a director of the Bleachers' Association, Ltd., £72,132.

CAPTAIN J. S. ALLAN, F.I.C., who for the past five years has been chief chemist to Wiggins, Teape and Co., Ltd., has now been appointed manager of the Glory Paper Mills of the company.

THE FACTORY of the National Fireworks Co. at Hanover, Mass., is reported to have been completely wrecked by a series of explosions. Three workers were killed and more than 20 sustained injuries.

THREE MEN WERE GASSED at the Newton gasworks of the Manchester Corporation on Wednesday, May 8, while repairing a container. Albert Willis, aged 50, died after being taken to hospital.

THE PRINCE OF WALES opened the North-East Coast Exhibition and the new mining department of Armstrong College at Newcastle on Tuesday. Science, he said, must show the way to an improvement in our methods.

APPLICATIONS ARE INVITED by the London County Council for two Robert Blair Fellowships in applied science and technology, each of the value of £450, tenable for one year. Further details will be found in our advertisement columns, p. xxiii.

THE CHILEAN FINANCE MINISTER, M. Pablo Ramirez, is at present in England, on business in connection with the consolidation of the Chilean nitrate industry. On Tuesday he was entertained to dinner by the Chilean Minister in Great Britain, Sir Austen Chamberlain being present.

ITALIAN PRODUCTION of lead ore rose in 1927 to 55,445 tons, and that of zinc ore to 225,334 tons, as compared with 45,158 and 158,278 tons respectively in 1913. The greater part of the ores was obtained from Sardinia, some also from Trieste, Milan, Turin, Padua, Florence and Carrara. The greatest centre of zinc production is at Vado Ligure, and that of lead at Pertusola, near Spezia (North Italy).

THE HIGHEST BID for the Nebraska nitrate field, for which tenders have been invited by the Chilean Government, is reported to have been made by Guggenheim's. The content of the field was estimated by the Government at 80,000,000 quintals, and it was required that bidders should undertake to extract this amount within 20 years. It is understood that the Guggenheim bid is in the region of £2,500,000, and that they guarantee an extraction of between 100,000,000 and 120,000,000 quintals.

THE N.T. ARTIFICIAL WOOL CO., LTD., which has a capital of £250,000 in 150,000 10 per cent. cumulative participating preference shares of £1 each and 500,000 ordinary shares of 4s. each, made an issue on Tuesday of 120,000 of each class at par. The company will acquire certain chemical and mechanical processes for the manufacture of an artificial wool or a substitute for wool (known as "N.T." —nouveau textile, from certain vegetable fibres, also the whole of the share capital of the French company ("N.T." Société Anonyme). It is claimed that the product is practically indistinguishable from wool.

IN THE BOW COUNTY COURT, London, on Monday, before Judge Thompson, K.C., Sarah Dalton, of 23, Maryland Square, Stratford, claimed under the Workmen's Compensation Act £300 from Jenson and Nicholson, Ltd., of Warton Road, Stratford, paint and varnish manufacturers, for the death of her husband, W. J. Dalton, who was knocked down by a cycle whilst passing from one part of the works to another, and received injuries to the head from which he died. He was earning £3 a week. Counsel announced that a settlement had been arrived at whereby the applicant should receive £275, and this arrangement was sanctioned.

THE OFFICIAL REPORT of the accident at the factory of Explosives and Chemical Products, Ltd., Essex, in October last, states that as all the workers who were in the building were killed instantaneously, it cannot be expected that the cause of the explosion will ever be ascertained with certainty. The mixing house contained 1,850 lb. of explosive and it is just possible that one of the victims was carrying a box of explosive, and may have dropped the box. The most likely cause of the explosion, however, was a fracture of some part of the mixing machine, or the condensation of some ethylene glycol denitrate on some part of the mixer or elsewhere. It is also possible that there was a fault in one of the stirrers.

UNIVERSITY NEWS:—*Sheffield:* E. B. Sanigar has been appointed part time demonstrator in chemistry.

AS THE RESULT of the explosion of a tank containing chlorine gas, at Syracuse, New York, thirty people were gassed, two of whom are not expected to recover.

THE DORR CO., LTD., of 16-17, South Street, London, announce that on and after May 16 their address is Abford House, Wilton Road (Victoria), London, S.W.1.

A BURSARY of £25 a year in the Metallurgical Department of Sheffield University in connection with metal plate work research has been founded by the Worshipful Company of Tin Plate Workers.

SIR ALEXANDER GIBB, who had previously held the position of deputy chairman, was elected chairman of the Council of the London Chamber of Commerce on Tuesday, in succession to Sir Stephen Demetriadi.

A CONTRACT has been placed with Palmers' Shipbuilding and Iron Co., Ltd., for the conversion of a large vessel, formerly the "Medic," a White Star liner of 12,222 tons, into a whale oil factory. The vessel was purchased recently by a Norwegian firm for use in the whaling industry.

MR. ARTHUR K. DAVIES, a managing director of the Bleachers' Association, Ltd., and chairman of the Employers' Federation of Bleachers, has been presented by the Federation with a painting of himself by Mr. E. H. Mooney, on the occasion of the twenty-first anniversay of the Federation. The presentation, which included also an album of the autographs of Mr. Davies's friends in the bleaching trade, was made by Mr. Thomas Hadfield, vice-chairman of the Federation.

SIR SAMUEL HOARE, Minister of Air, was present on Monday at a meeting of the Chelsea Society at which the erection of the proposed electrical generating station at Battersea was discussed. With regard to the danger of emission of sulphur fumes, he said that if, as the result of the investigations now proceeding, it was found that the fumes could not be eliminated, he was certain that whatever Government was in office would have to prevent the building of the power station.

MASS PRODUCTION of everyday articles of glassware was now on such a scale that the flooding of the market was approaching, said Mr. Herbert Webb, of Stourbridge, at the annual dinner, on Wednesday, of the Society of Glass Technology, at the Monico Restaurant, London. In several lines in that industry, such as bulbs, bottles, and possibly plate and sheet glass, he said, saturation had been reached, so that co-operation on a national basis was imperative. At a meeting of the Society, held at the University College, London, earlier in the day, it was decided to form a London section.

A SERIOUS OUTBREAK OF FIRE occurred from an unknown cause, at 5.30 p.m. on Friday, May 10, at Iceland Wharf, Old Ford Road, London, E., the premises occupied by Forbes, Abbott and Leonard, Ltd., chemical manufacturers. A district fire call was circulated. The official report of the damage indicates that a range of buildings of one floor, covering an area of about 150 ft. by 70 ft., used as refinery, office and store, had about two-thirds and the contents severely damaged by fire. The rest of the buildings and the contents and some stock in the yard were slightly damaged by fire, heat, smoke and water.

A VERDICT of "death due to yellow atrophy of the liver, caused by contact with industrial poison used in the making of goggles," was returned at an inquest held at Hammersmith on Wednesday, May 1, on Elizabeth Ada Jenkins, aged 17, factory hand, who had been working for about eight weeks at the Newtex safety glass factory at Acton Vale. Mr. H. Hicks, chemical engineer, said that the solution used by the Newtex Co. for rendering celluloid sticky contained tetrachloroethane. Mr. Clements (for the company) said that, as the result of suggestions made by the Home Office, the use of the solution would probably be eliminated in future.

Obituary

LUIGI ALESSANDRI, professor of pharmaceutical chemistry in the University of Perugia, Italy, at Florence, aged 44.

MR. EDWARD S. PALMER, of Bangor Street, Cardiff, for nearly 40 years analytical chemist to Bird and Son, Ltd., oil importers, Cardiff, aged 66.

PROFESSOR RUDOLPH BIEDERMANN, of the German Patent Office and the University of Berlin, aged 85. He was for many years editor of the *Technisch-Chemische Jahrbuch* and the *Chemiker-Kalender*.

MARTIN F. QUINN, a pioneer in the American wood distillation industry, recently, aged 75. He developed the modern method of wood distillation, and was chief of the Keystone Wood Chemical and Lumber Corporation, one of the greatest undertakings of this kind in the world.

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TEXTILES.—The strengthening of viscose. L. Meunier and R. Guyot. *Revue générale des Colloides*, February, pp. 53–66.

Wetting agents. Industrial rôle of surface tension. Part I. *Revue des Produits Chimiques*, April 30, pp. 253–256.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

309,421. Chlorinated Hydrocarbons, Manufacture of. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, January 4, 1928.

The process is for the manufacture of materials from chlorinated hydrocarbons of wax-like character for impregnating or moulding purposes. The material is mixed with a small proportion of a fat, wax, resin, pitch, artificial or natural rubber, and/or a small proportion of a substance of alkaline action such as sodium phosphate, calcium oxide, magnesium oxide, pyridine, tetrahydroquinaldine, urea, and derivatives. The addition of these substances in the proportion of 5–20 per cent. to chlor-naphthalene or the like, prevents the skin disease usually associated with these substances.

309,516. 2-Amino-3-Carboxylic Acid and Intermediate Compounds, Manufacture of. O. Y. Imray, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, January 6, 1928. Addition to 282,450.

Specification No. 282,450 (see The Chemical Age, Vol. XVIII, p. 183) describes the manufacture of a complex iron compound of 2-amino-naphthalene-3-carboxylic acid by heating 2-hydroxy-naphthalene-3-carboxylic acid or an alkali salt with ammonia under pressure in the presence of an agent capable of yielding bi-valent iron ions. In this invention the agent yielding bi-valent iron ions is replaced by an agent yielding bi-valent ions of another metal of the iron group, such as cobalt or nickel. The iron compound can also be obtained by adding metallic iron and ammonium chloride or sodium chloride, or another chloride which attacks the iron under the existing conditions. If an iron autoclave is used, it is necessary to avoid the addition of other chlorides than those of iron, and to add a sufficient quantity of iron in the ferrous stage.

309,621. Alumina from Clay and other Aluminiferous Material, Process of Producing. M. Buchner, 1, Schellingstrasse, Hannover-Kleefeld, Germany. Application date, January 13, 1928.

Aluminiferous raw material, which does not contain more than traces of alkali metal, is calcined and digested with nitric acid. The aluminium nitrate solution is separated and treated with concentrated nitric acid or oxides of nitrogen to separate the nitrate, which is then decomposed by heat to obtain alumina. The oxides of nitrogen evolved are used to purify the nitrate, and the liquor is used for treating fresh raw material. The purification by means of nitric acid or nitrogen oxides removes iron. The treatment of the aluminiferous material with nitric acid may be effected under heat and pressure, which are increased in stages. The aluminium nitrate obtained may alternatively be evaporated to obtain crystals of aluminium nitrate, which are treated with concentrated or gaseous nitric acid to remove iron. The aluminium nitrate may be decomposed in the presence of alumina, or calcium, sodium, or potassium nitrate.

309,661. Sulphuric Acid and Cement, Production of. G. J. Harris, Norton Hall, The Green, Norton-on-Tees, Durham, and Imperial Chemical Industries, Ltd., Broadway Buildings, Westminster, London, S.W.1. Application date, February 6, 1928.

Sand, clay and calcium sulphate are ground and introduced into a kiln or furnace in suspension in air. The powdered material and fuel may be introduced through two or more concentric nozzles, or the powdered material may be fed into a hot stream of gas generated by the combustion of the pulverised fuel. The hot reaction gases containing sulphur dioxide and cement dust are passed through one or more separators, and the gas is then used for the manufacture of sulphuric acid. This process avoids excessive dilution of the sulphur dioxide.

309,708. Methanol, Recovery of. W. J. V. Ward, Norton Hall, The Green, Norton-on-Tees, Durham, and Imperial Chemical Industries, Ltd., Broadway Buildings, Westminster, London, S.W.1. Application date, March 21, 1928.

In the synthesis of higher alcohols such as isobutanol from carbon monoxide and hydrogen, the product contains also substantial quantities of methanol, and small quantities of unsaturated hydrocarbons. The solution is purified by treating with a salting out solution, and a solvent for hydrocarbons, *e.g.*, benzene, which is substantially immiscible with the mixture of crude methanol and the salting out solution. The purified methanol is then distilled from the salt solution to obtain a product substantially free from impurities.

309,743. Catalysis, Manufacture of. Howards and Sons, Ltd., Ilford, London, J. W. Blagden, Apple Tree House, Grove Road, South Woodford, Essex, and G. C. H. Clark, Church Street, Dagenham, Essex. Application date, April 20, 1928.

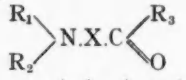
An alloy of one or more metals oxidisable by heating in air, with one or more metals oxidised under the same conditions much more easily, yields, when heated, a porous mass, which is of increased catalytic activity. The less oxidisable metal may be copper, aluminium, or nickel, and the more oxidisable metal may be magnesium, calcium or zinc. The catalyst is made by heating the alloy in air to a temperature at which the greater part of the metals are converted into oxides.

Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention :—282,111 (I.G. Farbenindustrie Akt.-Ges.), relating to arylamino-naphthalene derivatives, see Vol. XVIII, p. 150 ; 283,489 (Soc. Anon. Fonderia Milanese di Acciaio), relating to steel obtained from electric furnaces (see Vol. XVIII, p. 31 (Metallurgical Section) ; 283,510 (I.G. Farbenindustrie Akt.-Ges.), relating to therapeutic basic nitro derivatives of 9-amino-acridine (see Vol. XVIII, p. 248 ; 284,615 (J. R. Geigy Akt.-Ges.), relating to acid dyestuffs of the phenonaphthosafranine series (see Vol. XVIII, p. 327 ; 285,080 (A. Boehringer), relating to tetrazoles, see Vol. XVIII, p. 348 ; 287,050 (I.G. Farbenindustrie Akt.-Ges.), relating to condensation products of the pyrene-quinone series, see Vol. XVIII, p. 463 ; 287,072 (Nitrogen Engineering Corporation), relating to synthetic ammonia, see Vol. XVIII, p. 495 ; 291,433–4, 302,268–9 (Holzverkohlungs-Industrie Akt.-Ges.), relating to concentration of volatile aliphatic acids, see Vol. XIX, p. 126, and Vol. XX, p. 159 ; 294,236 (American Potash and Chemical Corporation), relating to boric acid, see Vol. XIX, p. 297 ; 294,264 (I.G. Farbenindustrie Akt.-Ges.), relating to silicic acid sols, see Vol. XIX, p. 297 ; 296,662 (Soc. Générale Metallurgique de Hoboken), relating to sulphuric acid, see Vol. XIX, p. 441.

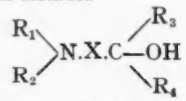
International Specifications not yet Accepted

307,304 and 307,307. Synthetic Drugs. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, March 2, 1928.

307,304. Amino-alcohols are obtained by treating a compound of the formula



with a Grignard reagent of the formula $Y.Mg.R_4$, in which Y represents a halogen, in the presence of ether or pyridine. The products have the formula

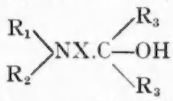


where R_1 and R_2 represent alkyl groups or hydrogen, or are joint members of a nitrogen-containing heterocyclic ring,

X represents an aliphatic residue such as $-Ch_2-$, $-C_2H_4-$, $-CH(CH_3)-$, or an aralkyl, arylaminoalkyl, or aryloxyalkyl residue, R_3 represents hydrogen or an alkyl, aryl, aralkyl, hydroaromatic, or heterocyclic residue, and R_4 represents an alkyl, aryl, aralkyl, hydroaromatic or hererocyclic residue. Examples are given.

307,307. Amino-alcohols are obtained by treating an ester of the formula

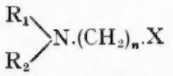
in which R_1, R_2 and X are defined as above, and R_4 represents an alkyl or aryl group, with a Grignard reagent of the formula $Y.Mg.R_3$. The products have the formula



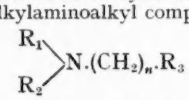
in which R_1, R_2, and X are as defined above, R_3 represents an alkyl, aryl, aralkyl, hydroaromatic, or heterocyclic residue.

307,305. Amino Compounds. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, March 2, 1928.

A compound of the formula



in which R_1 and R_2 represent alkyl groups or hydrogen, X represents halogen, and n is an integer, is treated with a Grignard reagent of the formula $Mg.X.R_3$, where R_3 represents an aryl, hydroaromatic or heterocyclic residue. The products are aminoalkyl or alkylaminoalkyl compounds of the formula



307,457. Catalysts for Ammonia Synthesis. Selden Co., McCartney Street, Pittsburg, U.S.A. (Assignees of A. O. Jaeger, 9, North Grandview Avenue, Crafton, Pa., U.S.A.) International Convention date, March 8, 1928.

These catalysts are composed of zeolites or non-siliceous base-exchanging bodies which are combined or mixed with the catalytically active components.

307,471. Ethyl Acetate. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date March 8, 1928.

Acetic acid is employed in excess with alcohol in a still, a strong ethyl acetate is returned from the condenser to the top of the still and flows down in counter current to the rising vapour. An excess of alcohol is employed towards the end of the reaction.

307,481. Dyes. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, March 10, 1928.

Halogen anthanthrones are converted to the nitriles by boiling with cuprous cyanide in quinoline or benzyl cyanide. Several anthanthrone nitriles are described, which are vat dyes or intermediates for other vat dyes.

307,484. Synthetic Drugs. F. Hefti, Dammstrasse, Altstetten, Zurich, Switzerland. International Convention date, March 9, 1928.

Phenyl-alkyl-barbituric acid and 1-phenyl-2 : 3-dimethyl-4-dimethyl-amino-5-pyrazolone are melted together to obtain a double compound.

307,704. Dyes. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, March 10, 1928.

Monoazo dyes are obtained by coupling 1-amino-2-methyl-4-alkyloxy-3 : 5-dihalogen-benzene with an arylide of 2 : 3-oxynaphthoic acid.

307,709. Sulpho Acids. Deutsche Hydrierwerke, Akt.-Ges., 163, Kantstrasse, Charlottenburg, Berlin. International Convention date, March 9, 1928.

Alcohols with more than 8 carbon atons, *e.g.*, cetyl alcohol, are heated with sulphuric acid and or chlorsulphonic acid in the presence of acid anhydrides, diluents such as nitrobenzene, and catalysts such as phosphoric anhydride. The products are wetting, emulsifying, and cleaning agents.

307,798. Amines. Knoll Akt.-Ges. Chemische Fabriken, and K. F. Schmidt, 97, Bleichstrasse, Ludwigshafen-on-Rhine, Germany. International Convention date, March 13, 1928.

Organic acids or their derivatives are treated with hydrazoic acid in the presence of catalysts. Benzoic acid or the ethyl ester may be treated with hydrazoic acid in the presence of sulphuric acid and chloroform to obtain aniline Benzylamine is obtained fron phenylacetic acid, tetramethylene- and pentamethylene-diamine from adipic acid and *d*-leucine respectively, methylamine from acetic anhydride.

307,802. Friedel-Crafts Reactions. F. Hofmann, 36, Auenstrasse, Breslau, and C. Wulff, 22, Maxstrasse, Breslau, Germany. International Convention date, March 13, 1928.

The aluminium chloride usually employed is replaced by a boron halide, *e.g.*, the fluoride, or an addition compound. Reactions such as the union of hydrocarbons and their derivatives with organic halogen compounds, the splitting of hydrocarbon oils into lower hydrocarbons, and the addition of hydrogen halides to olefines may be effected in this way, and examples are given.

307,838. Dyes. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, March 14, 1928.

An α-amino-1 : 11-anthrimido-carbazole or a derivative is treated with a halogen anthroquinone or a derivative in a high-boiling organic solvent, and in the presence of an acid fixing agent and a catalyst such as copper or a salt. Fast reddish-brown to brownish-black dyes are obtained, and are isolated by filtration of the melt or after dilution with pyridine, toluene, or an alcohol.

307,871. Dyes. Compagnie Nationale de Matières Colorantes et Manufactures de Produits Chimiques du Nord Réunies Etablissements Kuhlmann, 11, Rue de la Baume, Paris. International Convention date, March 15, 1928.

Chromium compounds giving brighter dyeings are obtained by treating azo dyestuffs with a chromium salt of an organic acid of the aromatic series, *e.g.*, chromium benzene sulphonate, chromium 1 : 5-naphthalene-disulphonate. These are obtained by double decomposition between the barium or calcium salts and chromium sulphate.

307,881. Metallic Oxides and Silica. J. Blumenfeld, 129, Avenue des Champs Elysées, Paris. (Assignee of Verein für Chemische und Metallurgische Produktion, Karlsbad, Czecho-Slovakia). International Convention date, March 15, 1928.

Titanium or zirconium halide is dispersed in a soluble solid salt such as alkali, alkaline earth, or rare earth chloride or sulphate, and treated with steam at 300°-400° C., and the temperature then raised to 800°-1,000° C. The alkali or other salt is leached out, leaving finely divided oxide. Silica is obtained in a similar manner.

Latest Notifications.

310,949. Separation of titanium dioxide hydrate from hydrolysable solutions of titanium salts. Blumenfeld, J. May 5, 1928.

310,964. Process for the production of dichlorethylene of low boiling-point from acetylene and chlorine. I.G. Farbenindustrie Akt.-Ges. May 5, 1928.

310,803. Developments of sols. I.G. Farbenindustrie Akt.-Ges. April 30, 1928.

310,815. Process for the manufacture of 2-halogen-benzothiazoles. I.G. Farbenindustrie Akt.-Ges. April 30, 1928.

310,816. Process for the manufacture of synthetic resins. I.G. Farbenindustrie Akt.-Ges. April 30, 1928.

310,891. Manufacture of vat-dyestuffs of the 3:4:8:9-dibenzpyrenequinone series. I.G. Farbenindustrie Akt.-Ges. May 2, 1928.

310,893. Process for producing colour-discharge effects. Durand and Huguenin Akt.-Ges. May 2, 1928.

310,972. Process of and apparatus for purifying sulphur and obtaining therefrom carbon disulphide and sulphur oxides. Merturi, G. Jakova. May 4, 1928.

Specifications Accepted with Date of Application

284,224. Liquid hydrocarbons, Process for producing. F. J. M. Hansen. January 24, 1927.

284,242. Derivatives of the anthraquinone series containing nitrogen, Manufacture of. I.G. Farbenindustrie Akt.-Ges. January 25, 1927.

284,247. Water insoluble azo dyestuffs, Manufacture of. I.G Farbenindustrie Akt.-Ges. January 25, 1927.

284,991. Obtaining iron from iron-containing ores with the formation of ferric chloride, Process of. Vereinigte Stahlwerke Akt.-Ges. February 7, 1927.

284,976. Iron or alloys thereof. A. A. Frey. February 5, 1927.

285,095. Esters of vinyl alcohol, Manufacture of. Consortium für Elektro-Chemische Industrie Ges. February 12, 1927.

285,504. Dyestuffs, Manufacture of. I.G. Farbenindustrie Akt.-Ges. February 18, 1927.

286,291. Hydrogen mixed with carbon monoxide and nitrogen from coke oven gas, Process and apparatus for producing. Compagnie Nationale de Matières Colorantes et Manufacture de Produits Chimiques du Nord Réunies Etablissements Kuhlmann. March 3, 1927.

288,126. Stable sulpho acids of high molecular weight and their salts, Production of. Oranienburger Chemische Fabrik Akt.-Ges. April 1, 1927.

293,863. 3-methyl-6-isopropylene-phenol, Manufacture of. Schering Kahlbaum Akt.-Ges. July 14, 1927. Addition to 273,686.

294,550. Condensation products of the anthraquinone series, Manufacture of. I.G. Farbenindustrie Akt.-Ges. July 25, 1927. Addition to 205,502.

294,655. Halogens and precious metals from sea-water, Process for extracting. H. Bardt. July 29, 1927.

300,249. Metallic alloy. Barber Asphalt Co. November 10, 1927.

300,254. Glycerine, Distillation of. E. I. Du Pont de Nemours and Co. November 11, 1917.

306,519. Catalytic apparatus. Selden Co. February 23, 1928.

310,393. Distilling oil, Process for. A. E. Harnsberger. January 23, 1928.

310,437. Reduction products of vat dyestuffs, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) January 21, 1928. Addition to 299,899.

310,438. Organic compounds containing oxygen, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) January 23, 1928.

310,353. Condensation products of the anthraquinone series, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) January 24, 1928.

310,354. Cotton dyestuffs, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) January 24, 1928.

310,356. Copper, Melting and refining of. H. H. Alexander. January 16, 1928.

310,559. 6-alkoxy 8-aminoquinolines, Manufacture of. I.G. Farbenindustrie Akt.-Ges., W. Schulemann, F. Schönhöfer, and A. Wingler. January 27, 1928. Addition to 267,457.

310,562. Condensation products from unsaturated higher fatty acids or their glyceryl esters, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) January 28, 1928.

310,594. Salts, Production of. A. E. Mitchell and Imperial Chemical Industries, Ltd. February 16, 1928.

310,623. Higher alcohols, Manufacture of. W. G. Davis, and Imperial Chemical Industries, Ltd. March 21, 1928.

310,635. Pure ammonium sulphate, Production of. R. E. Slade, and Imperial Chemical Industries, Ltd. April 11, 1928.

310,639. Tin from ores and the like, Recovery of. H. L. Sulman and H. F. K. Picard. April 14, 1928.

310,673. Ammonium salts, Method of producing. R. Tern. May 16, 1928.

310,687. Alkali metal nitrates, Production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) May 31, 1928.

Applications for Patents

Adelantado, L. Manufacture of superphosphates, etc. 14,518. May 9.

Boehringer, A. Ketones of pyridine and quinoline series. 14,689. May 10. (Germany, May 10, 1928.)

British Cyanides Co., Ltd., and Rossiter, E. C. Manufacture of mouldings of synthetic resins. 14,260. May 7.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Dyeing wool. 14,108. May 6.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Washing liquids. 14,417. May 8.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Process for modifying artificial fibres of cellulose ethers. 14,418. May 8

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of reserving agents for wool. 14,559. May 9.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of dyestuffs containing copper. 14,693. May 10.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of condensation products from aldehydes and phenols. 14,787. May 11.

Fairweather, D. A. W., and Scottish Dyes, Ltd. Dyestuffs. 14,682. May 10.

Fletcher, W. B., Imperial Chemical Industries, Ltd., McAulay, J., and Wheeler, T. S. Preparation of carbon bisulphide. 14,601. May 10.

Groves, W. W., and I.G. Farbenindustrie Akt.-Ges. Dyestuffs. 14,794. May 11.

Groves, W. W., and I.G. Farbenindustrie Akt.-Ges. Printing with dyestuffs. 14,795. May 11.

I.G. Farbenindustrie Akt.-Ges. Kinematograph projectors. 13,288. April 29.

I.G. Farbenindustrie Akt.-Ges. Manufacture of stable polymerisation products from vinyl esters. 13,423. April 30. (Germany June 19, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of 2-halogen-benzothiazoles. 13,451. April 30. (Germany, April 30, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of synthetic resins. 13,452. April 30. (Germany, April 30, 1928.)

I.G. Farbenindustrie Akt.-Ges. Separation of oils, etc. 13,542. May 1. (Germany, May 22, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of vat dyestuffs. 13,695. May 2. (Germany, May 2, 1928.)

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Production of coatings. 14,074. May 6.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Destructive hydrogenation of carbonaceous materials. 14,396. May 8.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Production of condensation products from cyclic hydrocarbons. 14,548. May 9.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Working-up oil-bearing residues from destructive hydrogenation. 14,647. May 10.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Making photographic prints. 14,667. May 10.

I.G. Farbenindustrie Akt.-Ges. Manufacture of artificial textiles. 14,079. May 6. (Germany, May 31, 1928.)

I.G. Farbenindustrie Akt.-Ges. Grain-immunising media. 14,106. May 6. (Germany, May 7, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of aralkyl esters of hydnocarpus fatty acids. 14,107. May 6. (Germany, May 7, 1928.)

I.G. Farbenindustrie Akt.-Ges. Kinematograph projectors. 14,228. May 7. (Germany, May 7, 1928.)

I.G. Farbenindustrie Akt.-Ges. Vulcanising rubber. 14,229. May 7. (Germany, May 15, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of dianthraquinonylamines of the anthraquinones acridone series. 14,258. May 7. (Germany, May 8, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of isatoic acid anhydride, etc. 14,259. May 7. (Germany, May 9, 1928.)

I.G. Farbenindustrie Akt.-Ges. Spools for textile industries. 14,379. May 8. (Germany, May 8, 1928.)

I.G. Farbenindustrie Akt.-Ges. Destruction of insects. 14,524. May 9. (Germany, May 9, 1928.)

I.G. Farbenindustrie Akt.-Ges. Photographic roll film. 14,525. May 9.

I.G. Farbenindustrie Akt.-Ges. Manufacture of vat dyestuffs. 14,557. May 9. (Germany, May 9, 1928.)

I.G. Farbenindustrie Akt.-Ges. Coagulation of emulsions of artificial rubber. 14,558. May 9. (Germany, May 10, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of monoazo dyestuffs. 14,692. May 10. (Germany, May 14, 1928.)

I.G. Farbenindustrie Akt.-Ges. Accelerating vulcanisation of rubber. 14,788. May 11. (Germany, May 18, 1928.)

Imperial Chemical Industries, Ltd. Apparatus for regulating flow of liquids, etc. 14,253. May 7.

Imperial Chemical Industries, Ltd., and McAulay, J. Removing hydrogen from gases. 14,269. May 7.

Imperial Chemical Industries, Ltd., and McAulay, J. Condensation of hydrocarbons. 14,270. May 7.

Imperial Chemical Industries, Ltd., and McAulay, J. Detonators. 14,391. May 8.

Imperial Chemical Industries, Ltd., and McAulay, J. Production of quicklime and sulphur dioxide. 14,476. May 9.

Imperial Chemical Industries, Ltd., and McAulay, J. Releasing pressure of mixtures of solids and liquids under high pressures 14,570. May 9.

Imperial Chemical Industries, Ltd., and McAulay, J. Preparation of methane, etc., from gases. 14,607. May 10.

Kali-Forschungs-Anstalt Ges. Production of potassium monophosphate. 14,049. May 6. (Germany, November 19, 1928.)

Kali-Forschungs-Anstalt Ges. Utilisation of liquors in potassium industry. 14,050. May 6. (Germany, December 6, 1928.)

Kali-Forschungs-Anstalt Ges. Production of magnesium oxide from kieserite. 14,223. May 7. (Germany, January 12.)

Kali-Forschungs-Anstalt Ges. Manufacture of potassium nitrate. 14,648. May 10. (Germany, February 11.)

Silica Gel. Corporation. Refining liquid hydrocarbons. 14,276. May 7. (United States, May 8, 1928.)

Soc. of Chemical Industry in Basle. Manufacture of dyestuffs. 14,664, 14,666. May 10. (Switzerland, May 10, 1928.)

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £30 per ton; powder, £32 per ton; extra fine powder, £34 per ton.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° TW.—£21 10s. to £27 per ton, makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s. per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton; powder, £21 per ton. (Packed in 2 cwt. bags carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 to £5 5s. per ton d/d carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 3d. to 1s. 8d. per gall. pyridinised industrial, 1s. 5d. to 1s. 10d. per gall.; mineralised 2s. 4d. to 2s. 8d. per gall.; 64 O.P., 1d. extra in all cases.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3⅞d. per lb., ex-wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton. carr. paid.

SODIUM BICHROMATE.—3½d. per lb.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.b. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—6¼d. to 6¾d. per lb. Crude 60's, 1s. 10d. per gall.

ACID CRESYLIC 99/100.—2s. 3d. to 2s. 9d. per gall. 97/99.—2s. 1d. to 2s. 2d. per gall. Pale, 95%, 1s. 10d. to 1s. 11d. per gall. Dark, 1s. 7½d. to 1s. 8½d.

ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £4 10s. per ton.

ANTHRACENE OIL, STRAINED, 1080/1090.—5½d. to 6d. per gall. 1100, 6d. to 6¼d. per gall.; 1110, 6¼d. per gall. Unstrained, 6¾d. to 7d. per gall.

BENZOLE.—Prices at works: Crude, 10d. to 11d. per gall.; Standard Motor, 1s. 5d. to 1s. 6d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall; Pure, 1s. 10d. to 1s. 11d. per gall.

TOLUOLE.—90%, 1s. 7½d. to 2s. per gall. Firm. Pure, 2s. to 2s. 2d. per gall.

XYLOL.—1s. 5d. to 2s. per gall. Pure, 1s. 8d. to 1s. 9d. per gall.

CREOSOTE.—Cresylic, 20/24%, 7¼d. to 7⅜d. per gall.; Heavy, 6¼d. to 6¾d. per gall. Middle oil, 4¼d. to 5d. per gall. Standard specification, 3¼d. to 4¼d. per gall. Light gravity, 3d. to 3¼d. per gall. ex works. Salty, 7¼d. per gall.

NAPHTHA.—Crude, 8½d. to 9d. per gall. Solvent, 90/160, 1s. 3½d. to 1s. 4d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 8d. per gall. Solvent 90/190, 1s. 1d. to 1s. 4d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £4 10s. to £5 per ton. Whizzed, £5 per ton. Hot pressed, £8 10s. per ton.

NAPHTHALENE.—Crystals, £12 5s. to £14 10s. per ton. Quiet Flaked, £14 to £15 per ton, according to districts.

PITCH.—Medium soft, 31s. 6d. to 35s. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 4s. to 4s. 6d. per gall. 90/160, 3s. 9d. to 4s. per gall. 90/180, 2s. to 3s. per gall. Heavy, 1s. 6d. to 1s. 9d. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—1s. 8½d. per lb.

ACID GAMMA.—4s. 6d. per lb.

ACID H.—3s. per lb.

ACID NAPHTHIONIC.—1s. 6d. per lb.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb.

ACID SULPHANILIC.—8½d. per lb.

ANILINE OIL.—8d. per lb. naked at works.

ANILINE SALTS.—8d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8½d. per lb.

o-CRESOL 29/31° C.—5½d. per lb.

m-CRESOL 98/100%.—2s. 3d. to 2s. 6d. per lb.

p-CRESOL 32/34° C.—2s. 3d. to 2s. 6d. per lb.

DICHLORANILINE.—1s. 10d. per lb.

DIMETHYLANILINE.—1s. 11d. per lb.

DINITHROBENZENE.—8d. per lb. naked at works. £75 per ton.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 7½d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

a-NAPHTHOL.—2s. per lb. d/d.

B-NAPHTHOL.—10d. per lb. d/d.

a-NAPHTHYLAMINE.—1s. 3d. per lb.

B-NAPHTHYLAMINE.—3s. per lb.

o-NITRANILINE.—5s. 9d. per lb.

m-NITRANILINE.—3s. per lb. d/d.

p-NITRANILINE.—1s. 8d. per lb.

NITROBENZENE.—6d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb.

R. SALT.—2s. 2d. per lb.

SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.

o-TOLUIDINE.—8d. per lb.

p-TOLUIDINE.—1s. 9d. per lb. naked at works.

m-XYLIDINE ACETATE.—2s. 6d. per lb. 100%.

N. W. ACID.—4s. 9d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey, £16 10s. to £17 10s. per ton. Liquor, 9d. per gall.

ACETONE.—£78 per ton.

CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.

RED LIQUOR.—9d. to 10½d. per gall. 16° Tw.

WOOD CRESOTE.—1s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 8d. to 3s. 11d. per gall. Solvent, 4s. to 4s. 3d. per gall.

WOOD TAR.—£3 10s. to £4 10s. per ton.

BROWN SUGAR OF LEAD.—£38 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 3d. per lb. according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 9d. per lb.

BARYTES.—£5 10s. to £7 per ton, according to quality.

CADMIUM SULPHIDE.—5s. to 6s. per lb.

CARBON BISULPHIDE.—£25 to £27 10s. per ton, according to quantity

CARBON BLACK.—5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£45 to £54 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—4⅝d. to 5⅞d. per lb.

LAMP BLACK.—£32 10s. per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE, 30%.—£23 per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton, f.o.r. London.

SULPHUR.—£10 to £12 per ton, according to quality.

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra

SULPHUR PRECIP. B. P.—£55 to £60 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb., carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—6s. 10d. to 7s. per lb.

ZINC SULPHIDE.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£39 per ton ex wharf London in glass containers.

ACID, ACETYL SALICYLIC.—2s. 6d. to 2s. 8d. per lb.

ACID, BENZOIC, B.P. 2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 3d. to 1s. 4d. per oz., according to quantity.

ACID, BORIC B.P.—Crystal, 36s. to 39s. per cwt.; powder, 40s. to 43s. per cwt.; extra fine powder, 42s. per cwt., according to quantity. Carraige paid any station in Great Britain, in ton lots.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—2s. 1d. to 2s. 2d. per lb., less 5%.
ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.
ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 7d. per lb. Technical.—10½d. to 11½d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. 4½d. per lb., less 5%.
ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.
AMIDOL.—7s. 6d. to 9s. per lb., d/d.
AMIDOPYRIN.—7s. 9d. to 8s. per lb.
AMMONIUM BENZOATE.—3s. 3d. to 3s. 9d. per lb., according to quantity. 18s. per lb. ex Gum.
AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.
ATROPHINE SULPHATE.—9s. per oz.
BARBITONE —5s. 9d. to 6s. per lb.
BENZONAPHTHOL.—3s. to 3s. 3d. per lb. spot.
BISMUTH CARBONATE.—9s. 9d. per lb.
BISMUTH CITRATE.—9s. 3d. per lb.
BISMUTH SALICYLATE.—8s. 9d. per lb.
BISMUTH SUBNITRATE.—8s. 3d. per lb.
BISMUTH NITRATE.—Cryst. 5s. 9d. per lb.
BISMUTH OXIDE.—12s. 3d. per lb.
BISMUTH SUBCHLORIDE.—10s. 9d. per lb.
BISMUTH SUBGALLATE.—7s. 9d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W Qts. 11d. per lb.
BORAX B.P.—Crystal, 24s. to 27s. per cwt.; powder, 25s. to 28s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.
BROMIDES.—Ammonium, 2s. 2½d. per lb.; potassium, 1s. 11½d. per lb.; granular, 1s. 10½d. per lb.; sodium, 2s. 1½d. per lb.
CALCIUM LACTATE.—B.P., 1s. 2½d. to 1s. 3½d. per lb.
CAMPHOR.—Refined flowers, 2s. 11d. to 3s. per lb., according to quantity; also special contract prices.
CHLORAL HYDRATE.—3s. 1d. to 3s. 4d. per lb.
CHLOROFORM.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
ETHERS.—S.G. ·730—11d. to 1s. per lb., according to quantity other gravities at proportionate prices.
FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.
GUAIACOL CARBONATE.—4s. 6d. to 4s. 9d. per lb.
HEXAMINE.—2s. 3d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gall. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 4s. per gall.
HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 2s. 5d. per lb.; potassium, 2s. 8½d. per lb.; sodium, 2s. 7½d. per lb., in 1 cwt. lots, assorted.
IRON AMMONIUM CITRATE.—B.P., 2s. 9d. per lb. Green, 3s. 1d. per lb. Prices for 1 cwt. lots. U.S.P., 2s. 9d. to 3s. per lb.
IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.
IRON QUININE CITRATE.—B.P., 8¾d. to 9¼d. per oz., according to quantity.
MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 22s. per lb. net; Synthetic, 11s. to 12s. 6d. per lb.; Synthetic detached crystals, 11s. to 16s. per lb., according to quantity; Liquid (95%), 9s. 6d. per lb.
MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 5d. to 1s. 8d. per lb.
METHYL SULPHONAL.—18s. 6d. to 20s. per lb.
METOL.—9s. to 11s. 6d. per lb. British make.
PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.
PARALDEHYDE.—1s. 4d. per lb.
PHENACETIN.—2s. 6d. to 2s. 9d. per lb.
PHENAZONE.—3s. 11d. to 4s. 2d. per lb.
PHENOLPHTHALEIN.—6s. to 6s. 3d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—96s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P.C., 2s. 7d. per lb. in 1 cwt. lots.
POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.
POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.
QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins.
RESORCIN.—2s. 10d. to 3s. per lb., spot.
SACCHARIN.—47s. per lb.; in quantity lower.
SALOL.—2s. 3d. to 2s. 6d. per lb.
SODIUM BENZOATE, B.P.—1s. 8d. to 1s. 11d. per lb.
SODIUM CITRATE, B.P.C., 1911.—2s. 4d. per lb., B.P.C. 1923—2s. 7d. per lb. Prices for 1 cwt. lots. U.S.P., 2s. 6d. to 2s. 9d. per lb., according to quantity.
SODIUM FERROCYANIDE.—4d. per lb., carriage paid.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—100s. to 105s. per cwt. Crystals, 5s. per cwt. extra.
SODIUM SALICYLATE.—Powder, 2s. 2d. to 2s. 5d. per lb. Crystal, 2s. 3d. to 2s. 6d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 1d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £28 10s. per ton, according to quantity. Delivered U.K.
SULPHONAL.—9s. 6d. to 10s. per lb.
TARTAR EMETIC, B.P.—Crystal or powder, 2s. 1d. to 2s. 3d. per lb.
THYMOL.—Puriss., 9s. 1d. to 9s. 4d. per lb., according to quantity. Firmer. Natural, 12s. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.
AUBEPINE (EX ANETHOL).—11s. per lb.
AMYL ACETATE.—2s. 6d. per lb.
AMYL BUTYRATE.—5s. per lb.
AMYL SALICYLATE.—2s. 9d. per lb.
ANETHOL (M.P. 21/22° C.).—5s. 6d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—1s. 10d. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 10d. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL BENZOATE.—2s. 3d. per lb.
CINNAMIC ALDEHYDE NATURAL.—14s. per lb.
COUMARIN.—9s. per lb.
CITRONELLOL.—10s. per lb.
CITRAL.—8s. 3d. per lb.
ETHYL CINNAMATE.—6s. 6d. per lb.
ETHYL PHTHALATE.—3s. per lb.
EUGENOL.—12s. 6d. per lb.
GERANIOL (PALMAROSA).—22s. per lb.
GERANIOL.—6s. 6d. to 10s. per lb.
HELIOTROPINE.—5s. 6d. per lb.
ISO EUGENOL.—14s. 3d. per lb.
LINALOL.—Ex Bois de Rose, 12s. 6d. per lb. Ex Shui Oil, 10s. per lb.
LINALYL ACETATE.—Ex Bois de Rose, 16s. per lb. Ex Shui Oil, 12s. per lb.
METHYL ANTHRANILATE.—8s. per lb.
METHYL BENZOATE.—4s. per lb.
MUSK KETONE.—34s. per lb.
MUSK XYLOL.—7s. per lb.
NEROLIN.—3s. 9d. per lb.
PHENYL ETHYL ACETATE.—11s. per lb.
PHENYL ETHYL ALCOHOL.—10s. per lb.
RHODINOL.—52s. per lb.
SAFROL.—2s. 3d. per lb.
TERPINEOL.—1s. 6d. per lb.
VANILLIN, EX CLOVE OIL.—18s. 6d. per lb. Ex Guaiacol, 15s. 6d. per lb.

Essential Oils

ALMOND OIL.—Foreign S.P.A., 10s. 6d. per lb.
ANISE OIL.—3s. per lb.
BERGAMOT OIL.—23s. 6d. per lb.
BOURBON GERANIUM OIL.—21s. per lb.
CAMPHOR OIL.—1s. 3d. per lb.
CANANGA OIL, JAVA.—12s. per lb.
CASSIA OIL, 80/85%.—6s. 3d. per lb.
CINNAMON OIL LEAF.—8s. 6d. per oz.
CITRONELLA OIL.—Java, 2s. per lb., c.i.f. U.K. port. Ceylon, pure, 2s. 2d. per lb.
CLOVE OIL (90/92%).—10s. 6d. per lb.
EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—1s. 10½d. per lb.
LAVENDER OIL.—Mont Blanc, 38/40%, 17s. 6d. per lb.
LEMON OIL.—17s. 6d. per lb.
LEMONGRASS OIL.—4s. per lb.
ORANGE OIL, SWEET.—25s. per lb.
OTTO OF ROSE OIL.—Anatolian, 35s. per oz. Bulgarian, 75s. per oz.
PALMA ROSA OIL.—13s. per lb.
PEPPERMINT OIL.—English, 87s. 6d. per lb.; Wayne County, 14s. 6d. per lb.; Japanese, 7s. 6d. per lb.
PETITGRAIN.—8s. 6d. per lb.
SANDALWOOD.—Mysore, 28s. 6d. per lb.: 90/95%. 20s. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, May 16, 1929.

BUSINESS has been steady during the current week with prices generally firm. Export business has also been steady.

General Chemicals

ACETONE is firm at £75 to £85 per ton, according to quantity.

ACETIC ACID is steady and firm at £36 10s. to £37 10s. for 80% technical quality.

CITRIC ACID is firm at 2s. 2d. to 2s. 3d. per lb., less 5%, ex wharf.

ACID FORMIC is steady and firm at £42 per ton for 85%, and in good demand.

ACID LACTIC is unchanged at £43 per ton for 50% by weight.

ACID OXALIC.—The increased demand continues and price is firm at £30 10s. to £32 10s. per ton, according to quantity.

TARTARIC ACID.—The demand is increasing and price firm at 1s. 4¾d. per lb., less 5%.

ALUMINA SULPHATE is firm with supplies on the short side, 17/18%, £7 15s. to £8 per ton.

AMMONIUM CHLORIDE is unchanged.

ARSENIC is unchanged at about £16 5s. per ton, free on rails mines.

BARIUM CHLORIDE.—Still in short supply, with an active demand at about £11 10s. per ton.

CREAM OF TARTAR.—Firm at £94 to £98 per ton for 99/100% B.P., with demand increasing.

COPPER SULPHATE.—Unchanged and firm at about £28 per ton.

FORMALDEHYDE.—In brisk demand, price unchanged at about £39 per ton.

LEAD ACETATE.—Rather quiet at £44 per ton for white and £43 per ton for brown.

LEAD NITRATE is a little easier at about £34 per ton, with an improving demand.

LIME ACETATE is unchanged at £18 per ton.

LITHOPONE is steady and unchanged at £19 15s. to £22 per ton.

METHYL ACETONE.—£58 to £60 per ton, and with a fair demand.

POTASSIUM CHLORATE.—Unchanged at £28 to £30 per ton.

PERMANGANATE OF POTASH.—There is an increased demand, with price firm at 5½d. per lb. for B.P. quality.

PRUSSIATE OF POTASH.—In steady demand and firm at £63 10s. to £65 10s. per ton

SODA ACETATE.—Unchanged at about £22 per ton, with standard crystals still in short supply.

SODIUM BICHROMATE is in steady demand at 3⅝d. per lb., with discounts for contracts, position very firm.

SODIUM HYPOSULPHITE, PEA CRYSTALS.—Unchanged at £14 10s. to £15 per ton, with commercial in rather slow demand.

SODIUM NITRITE is steady at £20 per ton, with quite a brisk demand.

SODIUM PHOSPHATE.—£12 per ton for di-basic and £17 per ton for tri-basic.

SODA PRUSSIATE is firm at 4¾d. to 5½d. per lb., according to quantity.

TARTAR EMETIC.—Still rather slow at 11¾d. per lb.

ZINC SULPHATE.—Unchanged at £12 per ton.

Coal Tar Products

The prices of coal tar products remain about the same, although there is a little more inquiry for benzols and naphthas.

MOTOR BENZOL is quoted at about 1s. 7d. to 1s. 7½d. per gallon, f.o.r. makers' works, for prompt delivery.

SOLVENT NAPHTHA is quoted at 1s. 2½d. to 1s. 3d. per gallon, f.o.r.

HEAVY NAPHTHA is unchanged at 1s. 2d. per gallon, f.o.r.

CREOSOTE OIL remains unchanged at 4½d. per gallon on rails in the North and at 5¼d. per gallon in London.

CRESYLIC ACID.—The 98/100% quality is quoted at about 1s. 10d. per gallon, and the dark quality, 95/97%, at about 1s. 8d. per gallon, f.o.r.

NAPHTHALENES are unchanged, the firelighter quality being quoted at about £4 10s. per ton, the 74/76 quality at about £5 per ton, and the 76/78 quality at £6 to £6 5s. per ton.

PITCH.—The forward market is quite unsettled, but makers are holding out for 35s. to 37s. 6d. per ton, f.o.b. East Coast.

Nitrogen Products

Sulphate of Ammonia.—During the last week, on account of the cessation of demand for immediate consumption both at home and on the Continent, there have been considerable offerings and the price has receded to £9 15s. per ton f.o.b. U.K. port in single bags for neutral quality, basis 20·6 per cent. nitrogen. It is understood that some ordinary quality sulphate of ammonia is being offered at prices below this. No doubt the lower offering is in anticipation of the announcement of the price scale of the large Continental producers. The price is normally at its lowest for the month of June, and usually the month of May witnesses a considerable drop. Whether the price scale for 1929-30 will be the same as or lower than that of the previous year is at the moment a very open question. It will depend entirely on the stocks of unconsumed nitrogen left over at the end of the season. There is no doubt that there will be an increase in the production of sulphate of ammonia, but its extent will not be as great as anticipated some months ago. The tendency is for new synthetic plants to commence operations on a large scale some months after their original estimates.

Home.—The home demand in the United Kingdom has declined sharply. The present price of £10 13s. per ton delivered in 6-ton lots to consumer's nearest station for neutral quality, basis 20·6 per cent. nitrogen, remains in operation until June 30.

Nitrate of Soda.—Reports from various sources indicate a considerable increase in the consumption on that of last year. Nevertheless, on account of the increased production, stock carried over to the end of the year will amount to about six months' production. It seems likely that the price policy will depend on the extent to which producers decide to increase their production for the coming year.

Latest Oil Prices

LONDON, May 15.—LINSEED OIL was steady, unchanged. Spot, ex-mill, £29; May to August, £28 12s. 6d.; and September-December, £29, naked. RAPE OIL was quiet. Crude extracted, £41 10s.; technical refined, £43 10s., naked, ex-wharf. COTTON OIL was inactive. Egyptian crude, £27 10s.; refined common edible, £34; and deodorised, £36, naked, ex-mill. TURPENTINE was irregular. American, spot, 45s.; May-June, 43s. 9d.; and July-December, 42s. 6d. per cwt.

HULL.—LINSEED OIL.—Spot to June-August, £28 15s.; September-December, £28 17s. 6d. per ton, naked. COTTON OIL.—Bombay crude, spot, £26; Egyptian crude, spot (new) and May and June-August, £26 10s.; edible refined, spot and May and June-August, £30 5s.; technical, spot, £29 15s.; deodorised, spot, £32 5s. per ton, naked. PALM KERNEL OIL.—Crude, 5½ per cent., £32 10s. per ton, naked. GROUNDNUT OIL.—Crushed-extracted, £32 5s.; deodorised, £36 5s. per ton. SOYA OIL.—Extracted and crushed, £30; deodorised, £33 10s. per ton. RAPE OIL.—Crushed-extracted, £40 5s.; refined, £42 5s. per ton. CASTOR OIL.—Pharmaceutical, 50s. 6d.; firsts, 45s. 6d.; and seconds, 43s. per cwt. in barrels, net cash terms. TURPENTINE and COD OIL unchanged.

South Wales By-Products

SOUTH WALES by-product activities continue to be unsatisfactory. The demand for pitch remains slow but some patent fuel manufacturers have been buying quantities at from 33s. to 35s. per ton delivered. There are indications that the autumn export demand will be fairly heavy, and this is likely to make the market more active during the next few weeks. Road tar continues to have a slow demand at from 10s. to 12s. per 40-gallon barrel. Creosote is inactive with quotations unchanged at from 4½d. to 5½d. per gallon. Crude naphthalene has practically no demand round about 80s. per ton, while a similar remark applies to whizzed at about 100s. per ton.

Chemical and Metallurgical Corporation

Developments at Runcorn

AT the general meeting of the Chemical and Metallurgical Corporation, Ltd., in London, on Tuesday, the chairman, Dr. E. P. Andreae, said that the company had definitely established itself as a factor in the heavy chemical and metallurgical industries of the country, and had passed from the purely constructional stage to commercial manufacture of the reagents required for their hydro-metallurgical processes. Some idea of the growth of their business might be gathered from the steady increase in the tonnage handled in and out of the works; apart entirely from constructional material, the weight of raw and manufactured goods entering and leaving the works was at the present time in the neighbourhood of 3,000 tons per week. Their plant for the manufacture of sulphuric acid, hydrochloric acid, and ammonia, the reagents referred to, were now of such capacity as to be not only self-supporting, but, independently of any specialised processes, capable of material contribution to the profits of the company. The ore treatment plant in its first phases, namely, the chloridising of lead and brine leaching, was now undergoing trials. It was started up only last week, and so far, both mechanically and chemically, the process was working satisfactorily.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, May 15, 1929.

DURING the past week the heavy chemical market has shown little change, although the activity in enquiry has been more pronounced. There has, however, been little increase in the amount of actual business placed, this possibly being due to the near approach of the Election. The only change of any importance is a fall in the value of antimony oxide, which can now be obtained in the region of £33 per ton c.i.f. U.K. ports.

Industrial Chemicals

ACETONE.—B.G.S. £76 10s. to £85 per ton ,ex wharf, according to quantity. Inquiry remains satisfactory.

ACID ACETIC.—98/100% Glacial, £56 to £67 per ton, according to quality and packing, c.i.f. U.K. ports. 80% pure, £37 10s. per ton, ex wharf; 80% technical, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystals, granulated or small flakes, £30 per ton. Powder, £32 per ton, packed in bags, carriage paid U.K. stations. There are a few fairly cheap offers made from the Continent.

ACID CARBOLIC ICE CRYSTALS.—Unchanged at 6¼d. per lb., delivered or f.o.b. U.K. ports.

ACID CITRIC B.P. CRYSTALS.—Quoted 2s. 2½d. per lb., less 5% ex store, spot delivery. Offered at 2s. 2¼d. per lb., less 5% ex wharf, prompt shipment from the Continent.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy; dearsenicated quality, 5s. 6d. per carboy, ex works, full wagon loads.

ACID NITRIC 80° QUALITY.—£24 10s. per ton, ex station, full truck loads.

ACID OXALIC 98/100%.—Price remains unchanged at about 3½d. per lb., ex store. Offered for prompt shipment from the Continent at 3¼d. per lb., ex wharf.

ACID SULPHURIC.—£2 15s. per ton, ex works, for 144° quality; £5 15s. per ton for 168° quality. Dearsenicated quality, 20s. per ton extra.

ACID TARTARIC B.P. CRYSTALS.—Spot material now quoted 1s. 4½d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Spot material rather dearer at about £6 per ton, ex store. For prompt shipment, £5 15s. per ton, c.i.f. U.K. ports.

ALUM LUMP POTASH.—Unchanged at about £8 12s. 6d. per ton, c.i.f. U.K. ports. Crystal meal offered on spot at £9 per ton, ex store.

AMMONIA ANHYDROUS.—Quoted 7½d. per lb., carriage paid. Containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton; powdered, £38 per ton, packed in 5-cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID 880°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture, quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Spot material still is maintained at about the same price as before, but for forward shipment from China it is now offered at round about £33 per ton c.i.f. U.K. ports, May shipment.

ARSENIC WHITE POWDERED.—Unchanged at £18 5s. per ton, ex wharf, prompt despatch from mines. Spot material quoted £19 15s. per ton, ex store.

BARIUM CHLORIDE.—Quoted £10 10s. per ton. c.i.f. U.K. ports, prompt shipment.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 12s. 6d. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 5s. per ton to £4 15s. per ton, according to quantity and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE 40%.—Still in fairly good demand and price now quoted is £36 10s. per ton, ex store.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 5s. per ton, ex wharf.

LEAD, RED.—On offer at £29 15s. per ton, ex store.

LEAD, WHITE.—Quoted £37 10s. per ton, c.i.f. U.K. ports.

LEAD ACETATE.—White crystals quoted £41 10s. per ton; brown on offer about £39 10s. per ton, ex store.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality 64 O.P. quoted 1s. 4d. per gallon, less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4⅜d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance of 2½% for minimum 2½ tons to be taken.

POTASSIUM CARBONATE, 96/98%.—Spot material now quoted £26 10s. per ton, ex store. Offered from the continent £25 10s. per ton, c.i.f. U.K.

POTASSIUM CHLORATE, 99¾/100%.—Powder. Quoted £25 10s. per ton, ex wharf. Crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d. per ton c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Offered for prompt shipment from the continent at 6¾d. per lb., ex wharf. Spot material quoted 7d. per lb., ex store.

SODA CAUSTIC.—Powdered 98/99%. Now £17 10s. per ton in drums; £18 15s. per ton in casks. Solid 76/77% £14 10s. per ton in drums and 70/72% £14 2s. 6d. per ton in drums, all carriage paid buyers' stations, minimum four ton lots, for contracts 10s. per ton less.

SODIUM ACETATE 65%.—Crystal quality quoted £19 15s. per ton, ex wharf; 73/78% anhydrous quality on offer at £20 per ton, carriage paid buyers' stations.

SODIUM BICARBONATE.—Refined recrystallised £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Manufacturers advise an advance in price of ⅛d. per lb., making the spot price now 3⅜d. per lb. delivered as from July 1, with special concession for contracts from 2½ tons up to 25 tons.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality 27s. 6d. per ton extra. Light soda ash £7 1s. 3d. per ton, ex quay, minimum four-ton lots with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum four-ton lots. Prices for this year unchanged.

SODIUM NITRATE.—Ordinary quality quoted £10 12s. per ton, carriage paid buyers' sidings, minimum six-ton lots, usual extras for small quantities and refined qualities.

SODIUM PRUSSIATE.—Spot material quoted 7d. per lb. Offered for prompt shipment from the continent at 6¾d. per lb. c.i.f. U.K. ports.

SODIUM SULPHATE (SALTCAKE).—Prices 50s. per ton, ex works, 52s. 6d. per ton delivered for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption. Solid 60/62% £9 per ton. Broken 60/63% £10 per ton. Crystals 30/32% £7 2s. 6d. per ton, delivered buyers' works on contract, minimum four-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £10 7s. 6d. per ton; ground American, £9 5s. per ton, ex store.

ZINC CHLORIDE 98%.—British material now quoted £22 10s. per ton f.o.b. U.K. ports.

ZINC SULPHATE.—Offered from the continent at about £10 5s. per ton, ex wharf.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Non-Ferrous Metals Research

AT the ninth annual general meeting of the British Non-Ferrous Metals Research Association in London, on Monday, the principal subjects discussed were the proposal to establish the association in its own headquarters; the growth of the development section; and the new scale of grants promised by the Department of Scientific and Industrial Research. Mr. T. Bolton, the chairman, said that the Association had made very good progress, but they had got to realise that they had come to the parting of the ways. With an income from subscriptions nearly reaching £10,000 a year, the association had sufficient to remain in being as a useful nucleus of research, but the Department's new scheme for grants called for a considerable expansion.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, May 16, 1929.

In spite of the approach of the Whitsun holiday break chemicals seem to have been affected less than have some other markets and a fair business has been put through on the Manchester market during the past week. Although, generally speaking, values maintained their recent steadiness, there are one or two sections of the market where somewhat easier conditions seem now to be evident. Traders in this area are looking for a pretty lifeless time next week from the point of view of business.

Heavy Chemicals

Demand for prussiate of soda this week has only been moderate, but prices are well held at from 4⅝d. to 5d. per lb., according to quantity. There has been a limited enquiry about for sulphide of sodium, with the 60-65 per cent. concentrated solid quality on offer at £9 per ton and the commercial kind at round £8. Phosphate of soda is fairly steady at from £11 15s. to £22 per ton, but buying interest in this material during the past week has been slow. Contract deliveries of caustic soda remain at a fairly satisfactory level, with quotations firm and unchanged at from £12 15s. to £14 per ton, according to grade. Saltcake is in moderate request, with current offers in the neighbourhood of £2 12s. 6d. per ton. There is a quiet demand about for chlorate of soda, with values maintained at round 2¾d. per lb. Alkali is firm and meets with a fair volume of inquiry at about £6 per ton. Bichromate of soda is moderately active, with supplies obtainable at 3½d. per lb. Bicarbonate of soda is a firm section of the market at round £10 10s. per ton, and buying interest in this material is on a quietly steady scale. With regard to hyposulphite of soda, the demand leaves plenty of room for improvement, but quotations are well held; the commercial quality is on offer at from £8 15s. to £9 per ton, and the photographic at round £15 10s.

In the potash section, carbonate is attracting a fair amount of attention, and prices are quite steady at round £26 5s. per ton. Only a quiet business has been reported this week in the case of permanganate of potash, but there has been little alteration in values, the B.P. being quoted at 5¼d. per lb. and the commercial at about 5d. Interest in chlorate of potash this week has been somewhat quiet, but quotations keep up at from 3d. to 3½d. per lb. A moderate trade has been done in yellow prussiate of potash at from 6¾d. to 7¼d. per lb., according to quantity. Caustic potash shows no sign of easiness, and buying interest is fairly good; quotations range from £33 5s. per ton for prompt delivery of one to five-ton lots. Bichromate of potash continues to be offered on the basis of 4¼d. per lb.

The demand for sulphate of copper on this market has been rather less active and values are easing a little, offers this week having ranged from about £29 to £29 10s. per ton, f.o.b. Arsenic continues to meet with but a moderate enquiry, but quotations remain at about £16 per ton at the mines for white powdered, Cornish makes. The lead products are in quiet demand and prices are weak in tendency, nitrate being quoted at round £34 5s. per ton and white and brown acetates at £40 to £40 10s. and round £39 per ton, respectively. A similar tendency has been in evidence this week in the case of the acetates of lime, from £16 10s. to £17 per ton now being quoted for grey material and about £8 10s. for the brown.

Acids and Tar Products

Acetic acid is moving in fair quantities still, and prices are firm at £36 to £37 per ton for the 80 per cent. commercial quality and about £67 per ton for the glacial. Tartaric acid is steady and in moderate request at up to 1s. 4½d. per lb., with citric acid in a somewhat similar position at round 2s. 2d. per lb. Oxalic acid is in quiet demand with offers this week at about £1 11s. 6d. per cwt., ex store.

Pitch is inactive and values nominal at £1 11s. per ton, f.o.b. Creosote oil is easy at about 2⅞d. per gallon, and only a relatively small trade is being done. Sales of solvent naphtha are on a fair scale, and prices are steady at 1s. 3½d. per gallon, naked. Crude carbolic acid is maintained at about 1s. 11d. per gallon, naked, for 60's, with crystals in steady demand and firm at about 6¾d. per lb., f.o.b.

Company News

Allen-Liversedge.—A dividend at the rate of 6½ per cent. per annum (less tax) is announced for the six months ended April 30, on the preference shares.

Lewis Berger and Sons.—An interim dividend at the rate of 10 per cent. per annum, less tax, has been declared on the ordinary shares, for the half year, payable on June 1.

International Bitumen Emulsions, Ltd.—The company announce a further 5 per cent. interim dividend, less tax, for the year ended March 31, 1929, making 10 per cent. for the year.

Eastman Kodak of New Jersey.—The following dividends are payable on July 1: Regular dividend of 1¾ per cent. on preferred stock, regular dividend of $1.25 per share on common stock, and extra dividend of $0.75 per share on common stock.

Craig and Rose.—The report for the year to March 31 last states that after providing for tax, depreciation and directors' fees, the profits amount to £13,049. A dividend of 5 per cent. is recommended on the ordinary shares at the rate of 5 per cent. per annum, free of tax, and £6,886 is carried forward.

Liquid Air, Ltd.—Shareholders are informed by circular that negotiations have been opened with the British Oxygen Co., Ltd., and they are invited to consider an offer which has been received from the latter company providing for the exchange of one fully-paid ordinary share of the British Oxygen Co. for every four fully-paid shares in Liquid Air, Ltd. The offer is conditional upon the acceptance thereof by shareholders holding 80 per cent. of the issued capital of Liquid Air, Ltd., or such smaller proportion as may be fixed by the British Oxygen Co., Ltd.

British Cotton and Wool Dyers' Association.—The accounts for the year to March 31 last disclose a net profit of £94,196, which compares with £138,918 in the previous year. With the amount brought in, the disposable balance is £115,623, as against £164,094. The dividend for the year is unchanged at 10 per cent. Nothing goes to the reserve on this occasion, as against £50,000 for the preceding year, and £10,000 also went to the employees' benefit fund for that year. The carry forward this time is £33,207, as against £26,677 brought in.

Antofagasta (Chili) and Bolivia Railway Co., Ltd.—The directors announce that the accounts are not yet completed, but sufficient information is available to warrant them in making their dividend, etc., proposal for the year 1928. They have resolved to recommend a final dividend of 4 per cent. (less tax at 4s. in the £) on the Consolidated ordinary stock, making 7 per cent. for the year. It is proposed to transfer £100,000 to the reserve account, and after making provision for a contribution to the company's staff benevolent fund, the balance forward will be approximately £242,000, compared with £251,312 last year. It has been decided to summon the general meeting for June 11, at 12.30 p.m.

Glanzstoff Company's Report

The report of the Vereinigte Glanzstoff-Fabriken A.G. for 1928 refers to the severe restriction of activities in several branches of the textile industry towards the end of the year, and also to strong foreign competition, which produced a downward tendency in prices. The Cologne factory of Glanzstoff-Courtaulds G.m.b.H. and the factory of the Neue Glanzstoff-Werke A.G. in Breslau started working during the year. Neither of the works is at present working at full capacity, but this will probably be achieved during the current year. The factories of the American Glanzstoff Corporation started work in 1928, and were able to increase their production towards the end of the year to over 50 per cent. of their capacity. The company has decided to double its installations, and the necessary funds have been secured by the issue of 150,000 common shares, class B. The J. P. Bemberg A.G., Barmen, enlarged its interests in England by the constitution of the British Bemberg, Ltd. This latter company intends to put up a factory in Doncaster for the exploitation of the Bemberg process. Efforts are being made to renew a convention among the producers. The uncertainty regarding economic conditions in Germany and the absence of any basis regarding the reparation charges which will be imposed on Germany make a forecast as to the further development of the industry impossible.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

CHEMICAL COMPOUNDS, LTD., Market Place, Brentford. (C.C., 18/5/29.) £11 13s. March 27.

GIANNACOPULO, D. N., Mr., 7, Union Court, E.C., chemists' sundriesman. (C.C., 18/5/29.) £19 4s. 11d. November 30.

HAMMOND, William, 17, Willis Road, Stockport (trading as WM. HAMMOND AND CO.), chemical merchant. (C.C., 18/5/29.) £14 10s. 8d. April 9.

Deed of Arrangement

[The following deeds of arrangement with creditors have been filed under the Deeds of Arrangement Act, 1914. Under this Act it is necessary that private arrangements other than those executed in pursuance of the Bankruptcy Act shall be registered within seven clear days after the first execution by the debtor or any creditor. These figures are taken from the affidavit filed with the registered deed, but may be subject to variation on realisation.]

HILL, Thomas James, trading as HILL AND JACKSON, 4, King's Road, Peckham, and Canalside Works, Ormside Street, S.E., lubricating grease manufacturer. (D.A., 18/5/29.) Dated May 2, filed May 8. Trustee, A. E. Tilley, 8, Staple Inn, Holborn, C.A. Liabilities unsecured, £10,642; assets, less secured claims, £9,159.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case, the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

GRASSHOPPER, LTD., London, N., manufacturers of remedies. (M., 18/5/29.) Registered April 29, £6,000 debentures (inclusive of £5,000 already issued); general charge. *£4,000. May 29, 1928.

London Gazette, &c.

Notice of Dividend

HADDOCK, John, Whitehall Road, West Bromwich, Stafford, manufacturing chemist. Supplemental dividend, 2s. 0½d. per £, payable May 27, Official Receiver's Office, 191, Corporation Street, Birmingham.

New Companies Registered

ASTLEY DYE AND CHEMICAL CO., LTD.—Registered May 8. Nominal capital, £35,000 in £1 shares. To acquire the business of wholesale and retail manufacturers, producers, refiners, storers and transporters of and dealers in all kinds of vegetable, animal and mineral oils, soaps, greases, creosote, tar, chemicals and disinfectants, alkalies and dyewares, manufacturers of artificial manures and fertilisers, etc., as lately carried on by H. Pilling and Ellen Pilling as the "Astley Dye and Chemical Co.," at Mallison Street and Newnham Street, Bolton. Directors:—H. Pilling, The Haven Belmont Road, Bolton, J. Worthington, E. Bradshaw, P. F. Jackson, Dr. W. E. Bamber and J. O. Young.

METALLISATION (SALES), LTD., 22, Birchin Lane, London, E.C.2.—Registered May 6. Nominal capital, £10,000 in 5,000 ordinary shares of £1 each and 100,000 deferred shares of 1s. each. To carry on the business of engineers, manufacturers of and dealers in all kinds of plant, machinery and accessories used or required in the production or application of the coating of surfaces with metal and applying deposits of metals or metallic compounds to surfaces, and more particularly to sell, develop and work metal spraying apparatus manufactured by or for the Metal Coating Co., of Philadelphia, U.S.A., and/or Metallisation, Ltd., under patents possessed by those companies or one of them, etc. Directors:—F. B. Goodchild, H. J. Williams.

RADIUM SYNDICATE, LTD.—Registered May 13. Nominal capital, £100 in £1 shares. To establish and promote companies for the production, development and marketing of radium, and to acquire and dispose of shares and interests in such companies, etc. Directors:—A. Kampler, 120, Wymering Mansions, Maida Vale, London, W., A. H. Tysser.

STEAROLENE, LTD.—Registered May 9. Nominal capital, £100 in £1 shares. To carry on the business of manufacturers, blenders, refiners and distillers of and dealers in oils, fats and fatty acids and their by-products, etc. A subscriber:—G. A. Emes, 9, Aden Grove, Clissold Park, London, N.16.

THE N.T. ARTIFICIAL WOOL CO., LTD., Stafford House, 14-20, King William Street, E.C. The file number is 239,388. Registered as a "public" company on May 8. Nominal capital, £250,000 in 150,000 10 per cent. cumulative participating preference shares of £1 each and 500,000 ordinary shares of 4s. each. Purchasers, preparers, spinners, weavers, manufacturers, bleachers, dyers, printers and manipulators of and dealers in wool, cotton, cotton yarn, silk, artificial silk and similar natural or artificial products, and in particular to acquire from Textiles (New Process), Ltd., all or any of the following assets, viz.:—(*a*) the chemical and mechanical processes used by M. Joseph Viallet, of Paris, for the manufacture of an artificial wool or substitute for wool, known as "N.T.," from certain vegetable fibres, (*b*) all the share capital of "N.T. Société Anonyme," and (*c*) the sole right to the services and discoveries of M. Joseph Viallet for 10 years. Subscriber:—S. F. Smith, 14, Martaban Road, London, N.16.

Increased I.G. Profits

THE I.G. Farbenindustrie A.-G. has just issued its preliminary report for last year. After writing off a sum equivalent to £3,580,000 there remains a net profit of £5,900,000 (in the previous year £5,000,000). From this £580,000 is added to reserve, which is thus raised to £10,000,000, and £330,000 is allotted to a pensions fund. Following a practice which has been pretty general among big German industrial concerns since the reconsideration of the Reparations question began, the trust is very cautious in its dividend policy, and proposes to distribute only 12 per cent., or the same as last year. This is a great disappointment, for the shareholders had counted on 14, and speculators on the Bourse had actually bought the dividend warrants for 13. Some of the papers criticise the board's decision, but it is also suggested that a portion of the £3,000,000 of unissued shares left in the hands of the directors may have been disposed of in America, and have thus qualified for participation in the dividend.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

CHEMICAL AND OTHER PLANT AND EQUIPMENT.—A French firm in Paris desires to secure the sole representation of British manufacturers of apparatus and devices for handling liquids, for sterilising and purifying water and other liquids, for carbonising coal, lignite, etc., and distilling the products, for producing and using compressed air and for the manufacture of chemical products. (Ref. No. 430.)

Appointments Vacant

ASSISTANT COMMERCIAL MANAGER for chemical manufacturers. See p. xxiv.

SALESMAN for old-established firm of chemical merchants. See p. xxiv.